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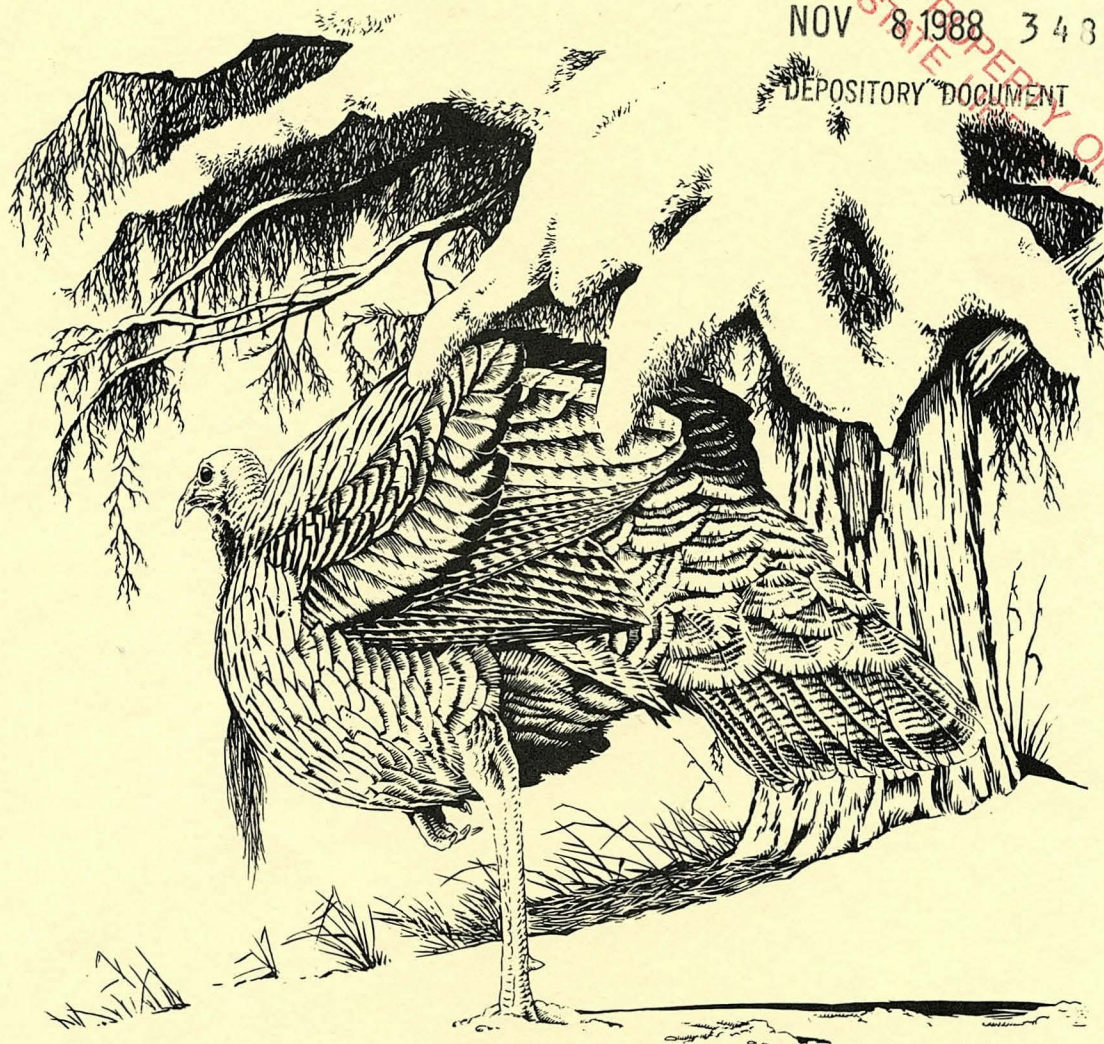
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# Yearbook of Population Trends for Missouri Wildlife 1988

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David  
Besenger

**Missouri Department of Conservation  
Wildlife Research Section  
October 1, 1988**





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## PREFACE

Each year employees of the Department of Conservation are bombarded with questions from the public and press regarding the status of Missouri's wildlife. What was the effect of last winter's snow?.....Is the outlook for hunting season a favorable one?.....Are rare and endangered species continuing to decline?.....and many others.

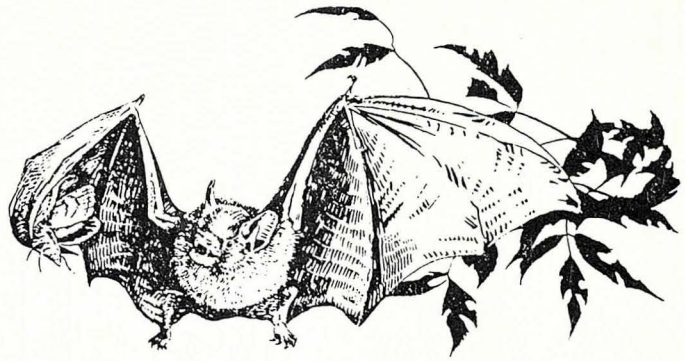
This population trends yearbook is the second in what we hope will become an annual publication. Your response in 1987 was very favorable and we know it's been a useful source of information for many employees.

The booklet is a compilation of much of the very latest information on populations of certain Missouri wildlife. It is designed for use by Department personnel to aid in responding to inquiries. Its availability is timed to precede our major autumn hunting seasons.

If you have questions or need other information, feel free to contact contributing authors at the Fish and Wildlife Research Center in Columbia (1110 College Avenue, Columbia, MO 65201; 314/449-3761). We want to thank many Department personnel, especially conservation agents, for providing much of the data for these important population surveys.

The information reported in this publication was obtained from projects funded in part with Federal Aid in Wildlife Restoration Act funds under Missouri's Pittman-Robertson Project W-13-R.

DAVE ERICKSON  
WILDLIFE RESEARCH SUPERVISOR



### ENDANGERED BATS

A total of 28 Missouri caves have harbored hibernating populations of at least 100 Indiana bats. Nine of these were censused during Winter 1987-1988 (Table 1). Of these, 4 caves showed increased or stable populations (compared to recent censuses), 3 showed declines, and 2 were newly reported and thus population trends could not be established. Because 1988 was an off year in the biennial survey of Indiana bat hibernacula, assessment of the overall population picture will have to wait until next year. The concern remains that while Indiana bat populations in Indiana and Kentucky have increased or stabilized in recent years, Missouri's total population may continue to decline, as it has over the past 8 years.

Recent gray bat maternity cave censuses have been encouraging. Some fluctuation in population appears normal. Nine populations increased or remained stable, 6 showed declines, trends at 3 could not be assessed, and figures reported for 6 caves are for transient or bachelor colony use (Table 2). Gray bat populations throughout their range appear to have stabilized in recent years, including those in Missouri.



TABLE 1. Missouri caves with recorded **Indiana bat** populations greater than 100.

Cave	County	Recovery Priority <sup>1</sup>	MAXIMUM PAST POPULATION		MOST RECENT CENSUS	
			Number	Year	Number	Year
Carroll	Camden	N/A	600	1956	14	1988
Bat	Crawford	N/A	800	1957	3	1976
Onyx	Crawford	2	12,700	1976	2,500	1988
Saloon	Crawford	N/A	150	1977	20	1987
Bear	Franklin	2	3,250	1979	400	1988
Copper Hol. Sink	Franklin	2	15,550	1975	600	1987
Cave Hollow	Iron	N/A	Unknown	--	250	1988
Pilot Knob	Iron	1	80,000	1962	13,900	1978
Coffin	Laclede	N/A	450	1978	0	1985
Mary Lawson	Laclede	N/A	250	1957	700	1988
Slaven	Laclede	N/A	400	1984	1,000	1988
Brooks	Pulaski	2	19,450	1978	4,900	1987
Bruce	Pulaski	N/A	500	1955	10	1987
Great Spirit	Pulaski	2	3,900	1980	40	1987
Onyx	Pulaski	N/A	600	1955	1	1987
Piquet	Pulaski	N/A	600	1954	575	1987
Ryden	Pulaski	2	10,550	1979	700	1987
Tunnel	Pulaski	N/A	4,000	1954	75	1987
Bat	Shannon	1	123,800	1972	4,150	1987
Chimney	Shannon	N/A	3,000	1966	0	1985
Martin #1	Shannon	2	8,100	1979	4,900	1987
Powder Mill	Shannon	N/A	150	1962	50	1987
Tumbling Creek	Taney	N/A	Unknown	--	750	1988
Donovan	Texas	N/A	400	1987	250	1988
Great Scott	Washington	1	85,700	1983	60,650	1987
Hamilton	Washington	N/A	125	1975	75	1988
Scotia Hollow	Washington	2	4,550	1983	5,300	1987
Smittle	Wright	N/A	550	1978	1	1987

<sup>1</sup> Priority assigned by USFWS Recovery Plan:

- 1 = Population > 30,000
- 2 = Population > 1,000 but < 30,000
- N/A = None assigned

TABLE 2. Results of **gray bat** maternity cave censuses, 1981-1988.

County	Cave	ESTIMATED POPULATION				
		1981	1983	1985	1987	1988
Barry	Blacksmith	8,000	3,450	26,500	- <sup>1</sup>	-
Benton	Estes	1,300	1,540	2,500	-	-
Boone	Boone	-	-	-	-	(400) <sup>2</sup>
Boone	Devil's Icebox	2,000	-	-	2,300	-
Boone	Holton	-	-	1,000	480	-
Camden	Adkins	26,800	22,850	30,000	-	39,800
Camden	Lower Burnt Mill	40,000	0	15,500	-	-
Camden	Mauss/Moles	42,800	50,000	54,500	-	54,800
Camden	River	(4,000)	(240)	(7,000)	-	? <sup>3</sup>
Carter	Coalbank	1,500	-	4,000	-	5,150
Christian	Rantz	? <sup>3</sup>	24,950	33,000	-	-
Crawford	Saloon	-	(6,750)	(15,000)	-	-
Dade	Maze	?	7,150	-	-	-
Dent	Bat	20,000	27,700	29,250	15,600	-
Franklin	Bat Nos. 2 & 3	3,000	2,120	3,650	-	6,120
Franklin	Roaring Spring	17,000	17,000	19,500	14,600	-
Hickory	Beck	?	?	?	?	-
Hickory	Blackwell	0	5,350	9,500	9,900	-
Jasper	Coolbrook	0	4,650	1,500	-	-
Laclede	Competition Bat	0	-	(6,000)	-	23,000
Laclede	Mary Lawson	21,500	0	19,000	-	30,600
McDonald	No Name	4,000	8,800	14,000	-	-
Oregon	Bat	1,700	-	4,000	-	-
Oregon	Dead Man	5,300	4,850	-	-	-
Oregon	Thrasher Ford	7,500	0	8,100	-	9,450
Ozark	Bat	22,500	33,250	21,000	-	-
Ozark	Bob & Mark No. 1	4,000	3,350	?	-	-
Ozark	Pine Hill	-	-	-	-	(1,800)
Ozark	Russell	-	-	-	-	-
	(1,000)					
Pulaski	Brown No. 1	50,000	33,250	44,000	32,300	-
Pulaski	Dry Branch	-	-	-	(1,100)	-
Pulaski	Great Spirit	(25)	(24,750)	(11,600)	(25,800)	-
Reynolds	Cooks	?	13,000	19,500	6,600	-
Stone	Stillhouse	3,000	0	?	-	-
Taney	Tumbling Creek	-	-	-	-	15,000
Texas	Bat	9,000	3,450	2,000	-	-
Texas	Dislocated Thumb	16,000	4,850	17,500	3,900	-
Wright	Smittle	(60,000)	(22,150)	(105,500)	-	(22,850)

1 - = Not surveyed.

2 ( ) = Not included in total because status and colony type uncertain.

3 ? = Bats used the cave, but their number could not be estimated.



## PRAIRIE-CHICKEN

Prairie chicken males gather each spring at traditional leks or booming grounds. Depending upon the weather, birds may gather as early as January and will continue to visit the grounds until June. Each year the number of birds on booming grounds in selected areas is determined by Department observers. These data provide an important indication of prairie-chicken status (Figure 1). In 1988, populations continued the gradual decline that has been apparent through the 1970's and 1980's. The small population north of the Missouri River as well as that to the south both declined from 1987. The total population for Missouri was estimated at 2,500-3,000 birds in the spring of 1988. Reasons for the decline are varied and believed to include the reduction in the acreage of native prairies, encroaching woodlands along draws and fence rows, and poor suitability of the predominant introduced grass, tall fescue.

The number of female prairie-chickens on or within one-half mile (0.6 km) of public prairies has generally increased after acquisition but declined during the 1980's (Figure 2). The number of cocks per area was, however, greater on and around prairies than on the routes which are predominantly private land. Although the absolute numbers were greater, the average number of cocks per area associated with larger prairies did not differ from those associated with smaller prairies.

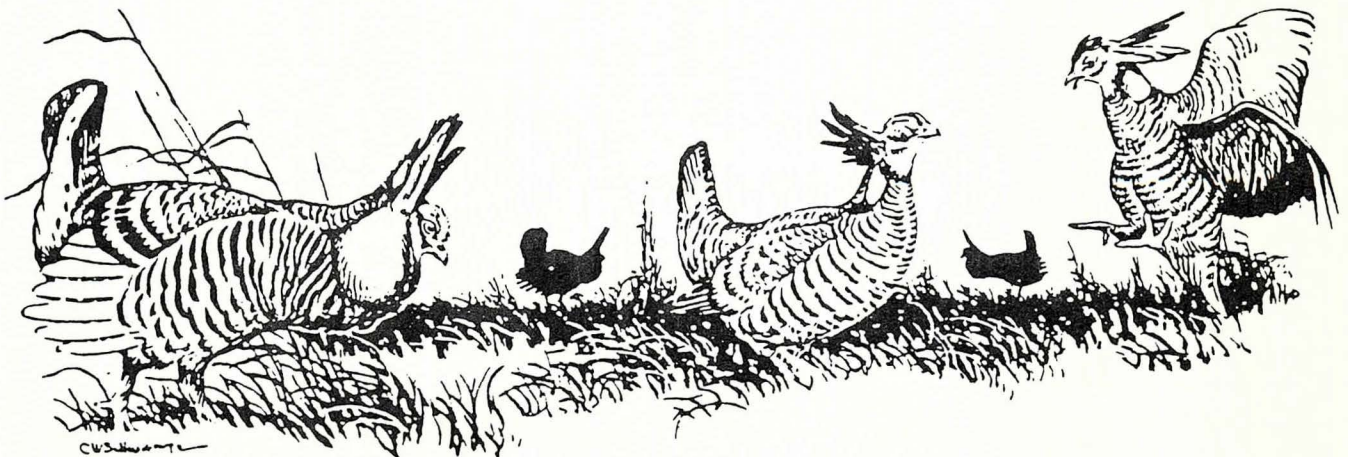


FIGURE 1. POPULATION TRENDS OF **PRAIRIE-CHICKENS** IN SOUTHERN MISSOURI.

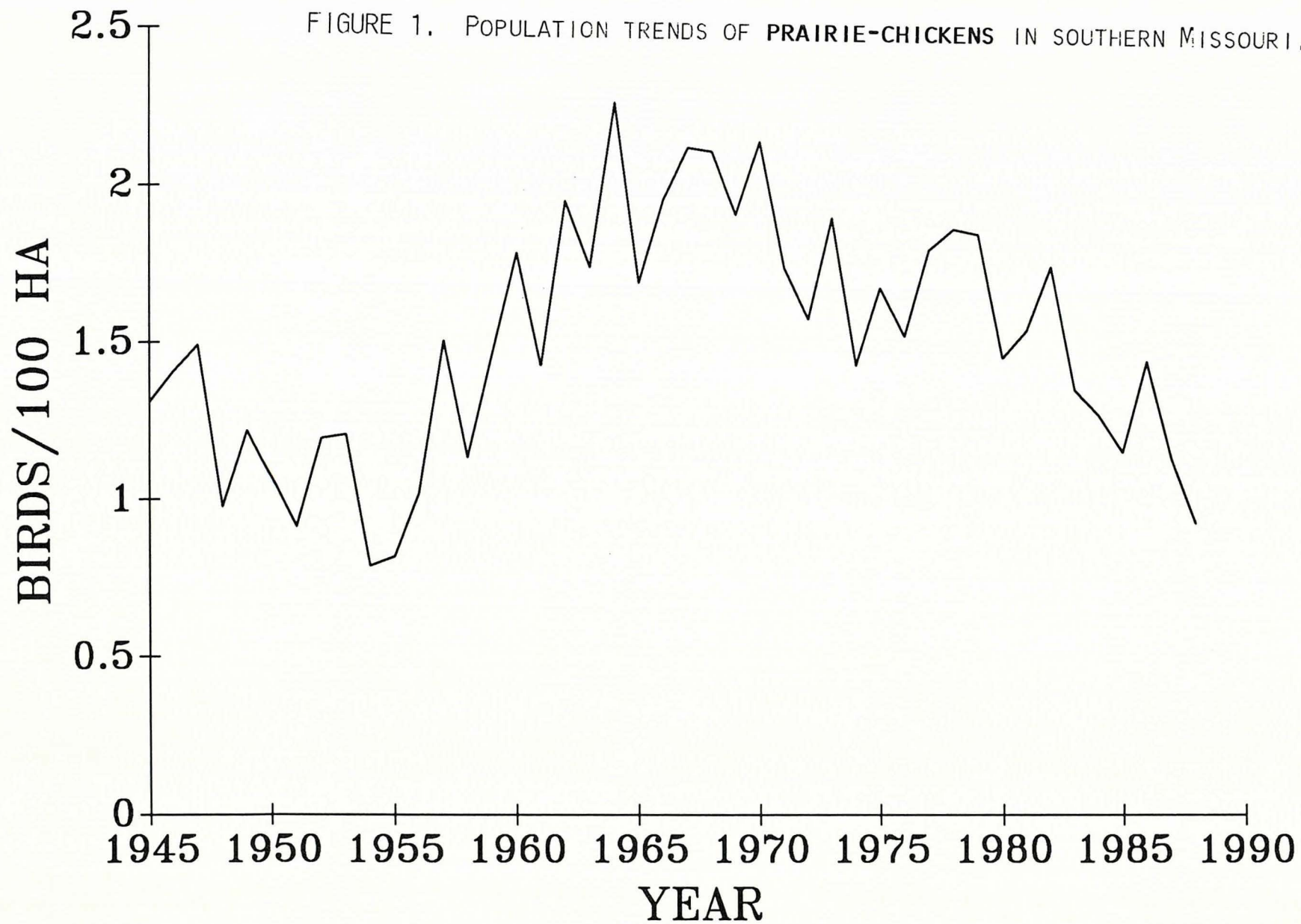
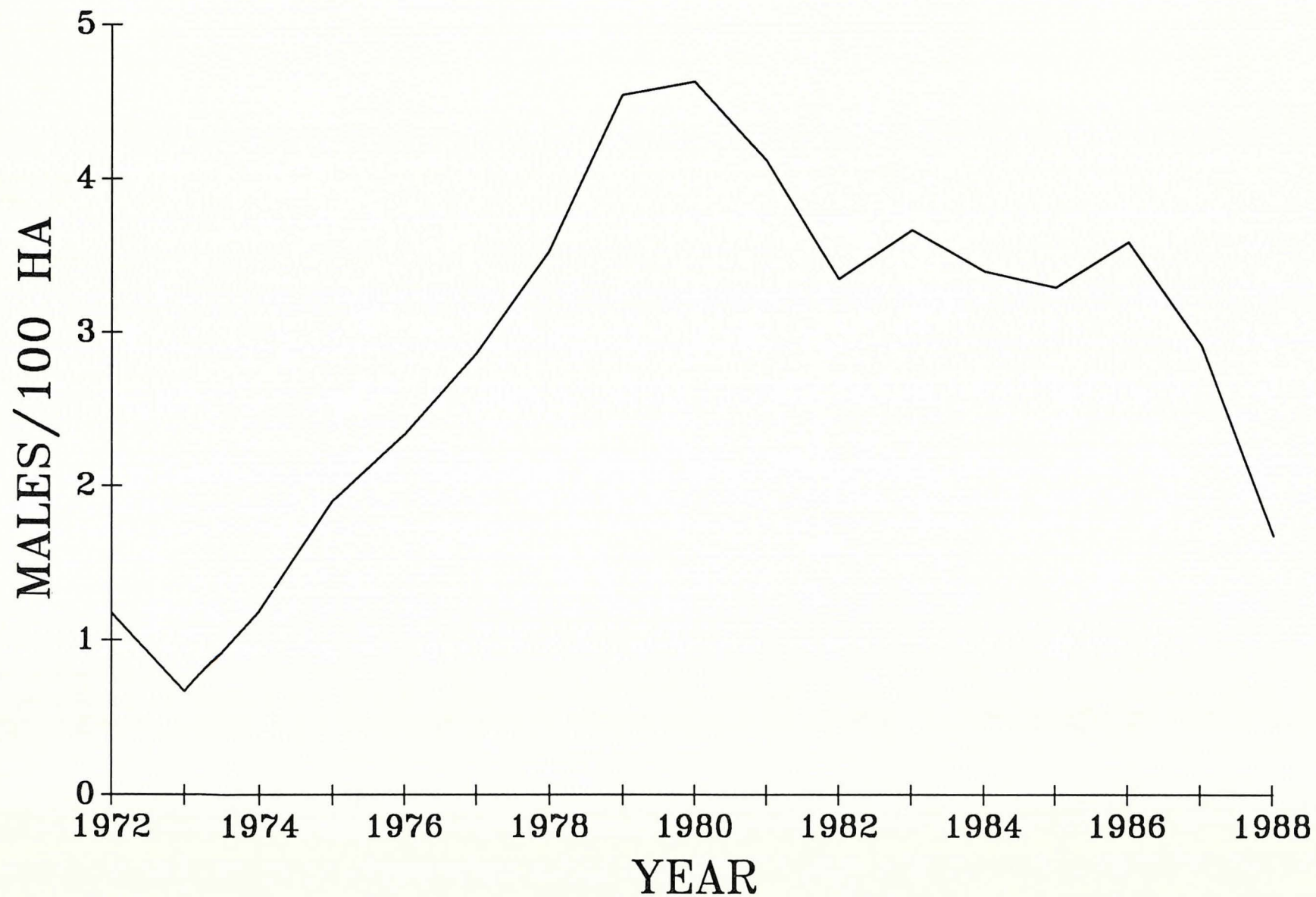




FIGURE 2. POPULATION TRENDS OF **PRAIRIE-CHICKENS** ON PUBLIC PRAIRIES IN MISSOURI.





COTTONTAIL RABBIT

Missouri's roadside rabbit survey has been conducted since 1947. Data collected by conservation agents in July yield population indices (Table 3) that allow us to predict harvest for the upcoming season (Figure 3). Predictions are made cautiously because severe fall and winter weather can reduce rabbit populations and hunting success. In 1988, the statewide rabbit count per mile (0.8) decreased 33% from 1987. Summer drought may have depressed the index, either by reducing rabbit populations or rabbit activity near roads. However, during the 1980 drought, the index (0.9 rabbits per mile) was 13% higher than the average for 1977-79.

Surveys of hunters provide estimates of rabbit harvest and hunting pressure. A post-season mail survey of small game hunters has indicated rabbit hunters and rabbit harvest have both decreased in number, 21 and 46%, respectively, between 1967 and 1987. Data from the 1987-88 hunting season are not available. Rabbit hunter-cooperators report on their hunts, providing information on dates and counties hunted, party sizes, number of hunting dogs used, and number of rabbits wounded or killed. Hunter-cooperators averaged 1.2 rabbits per hour of hunting during the 1987-88 hunting season, a 19% increase from 1987 (Table 4) and the highest kill rate in the past 12 years.



TABLE 3. Regional summer roadside cottontail rabbit census, 1988.

Zoogeog. Region	Number Routes	Number Miles	Young:Adults		% Change	Rabbits/Mile		% Change
			1987	1988		1987	1988	
NWP	12	242	1.7	1.4	-18	1.1	0.7	-36
NR	11	211	2.5	1.8	-28	2.3	1.2	-48
NER	20	402	3.0	2.1	-30	1.4	0.7	-50
WP	13	265	2.8	2.1	-25	1.3	1.1	-15
WOB	13	263	2.0	2.0	0	1.4	0.8	-43
OP	24	480	1.4	1.2	-14	0.8	0.6	-25
NEOB	12	232	2.5	1.6	-36	0.7	0.5	-29
ML	7	143	2.5	2.1	-16	1.1	0.8	-27
STATEWIDE	112	2238	2.2	1.8	-18	1.2	0.8	-33

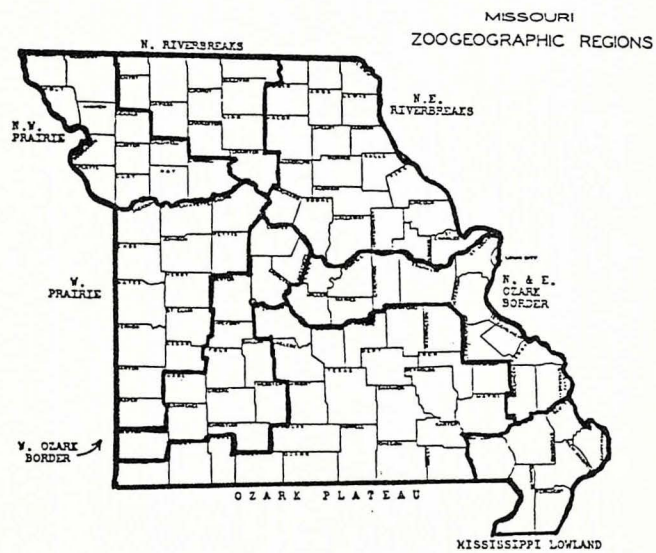


FIGURE 3. RELATIONS BETWEEN **COTTONTAIL RABBIT** DENSITY (MEAN COUNT PER ROUTE) AND TOTAL RABBITS HARVESTED (IN MILLIONS).

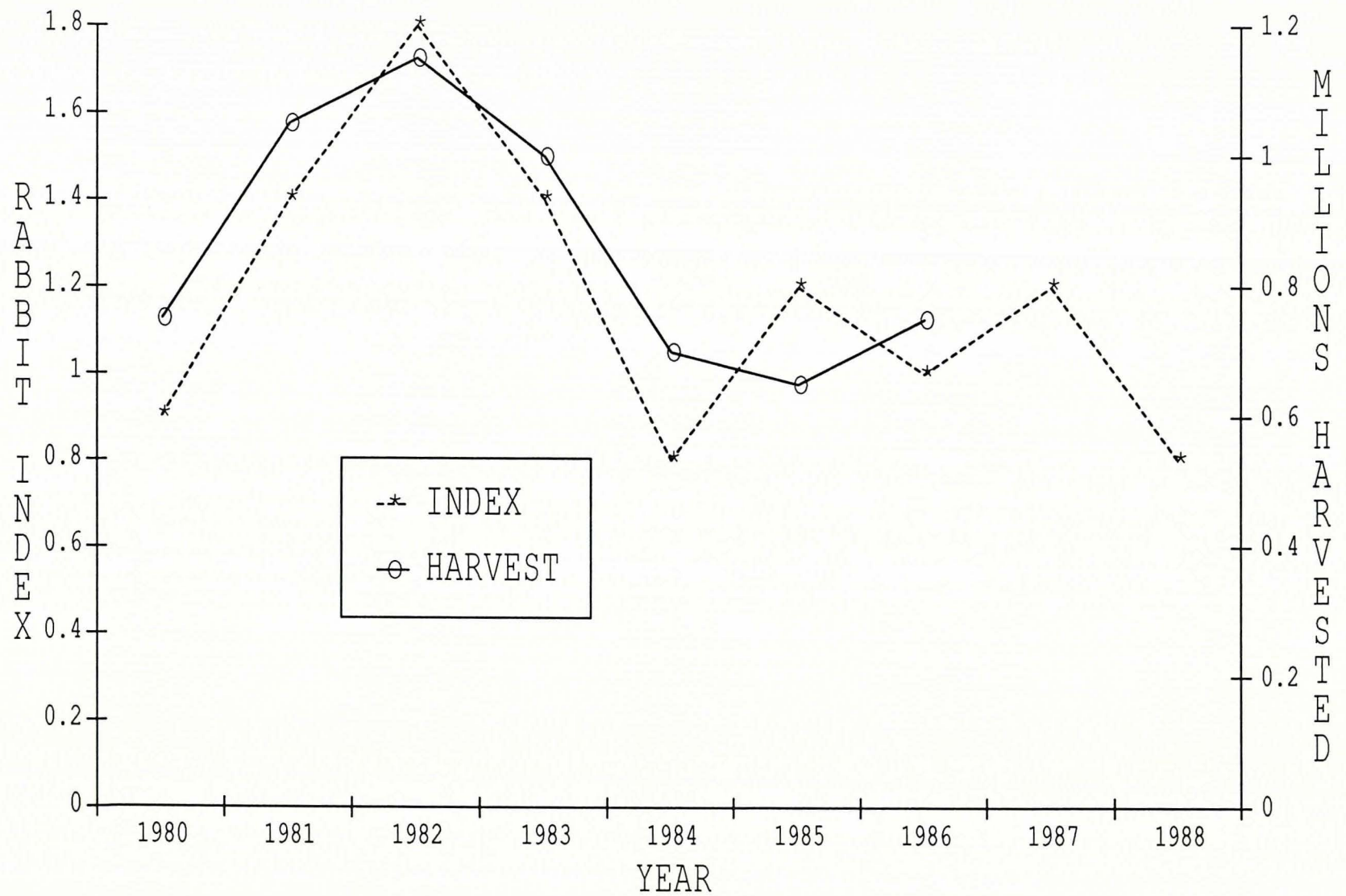
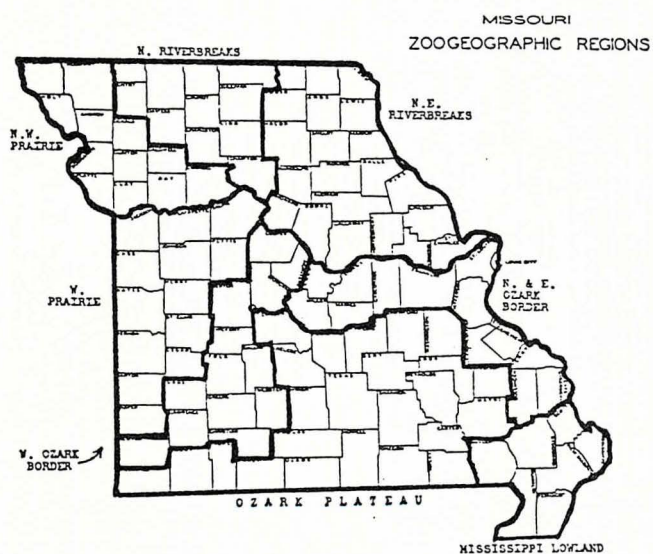




TABLE 4. 1987-88 Regional cottontail rabbit harvest by cooperators.

Zoogeographic Region	No. Hunters	Rabbits Killed	KILL PER TRIP		% Change
			1986-87	1987-88	
NWP	41	119	1.0	1.7	+70
NR	91	261	1.3	1.7	+31
NER	988	2219	1.1	1.3	+18
WP	283	673	1.1	1.6	+45
WOB	169	314	1.1	1.2	+9
OP	504	1105	1.0	1.3	+30
NEOB	441	747	0.6	1.0	+67
ML	390	643	0.8	0.9	+13
STATEWIDE	2907	6081	1.0	1.2	+20





### TREE SQUIRRELS

Information on annual squirrel harvests is collected by two methods, a small game harvest mail survey, and a squirrel hunter cooperator survey. The small game harvest survey provides statewide and regional estimates of total harvest and hunting pressure (Figure 4). The cooperator survey provides state, regional and period trend data on the age/sex and species composition of the harvest and harvest pressure (Tables 5 and 6).

Data on annual mast production provide the best indicator of potential changes in squirrel population (Figure 5). Lows in mast production, such as 1983 and 1984, result in decreased squirrel harvests in the following year. With the the slight decrease in mast production experienced in 1987, this year's squirrel population and harvest may also decline.



FIGURE 4. ANNUAL **SQUIRREL** HARVEST AND HUNTER NUMBERS DETERMINED FROM ANNUAL SMALL GAME HARVEST MAIL SURVEYS, 1967-1986.



FIGURE 5. RELATIONSHIP OF **SQUIRREL** HARVEST AND MAST PRODUCTION, 1967-1987.

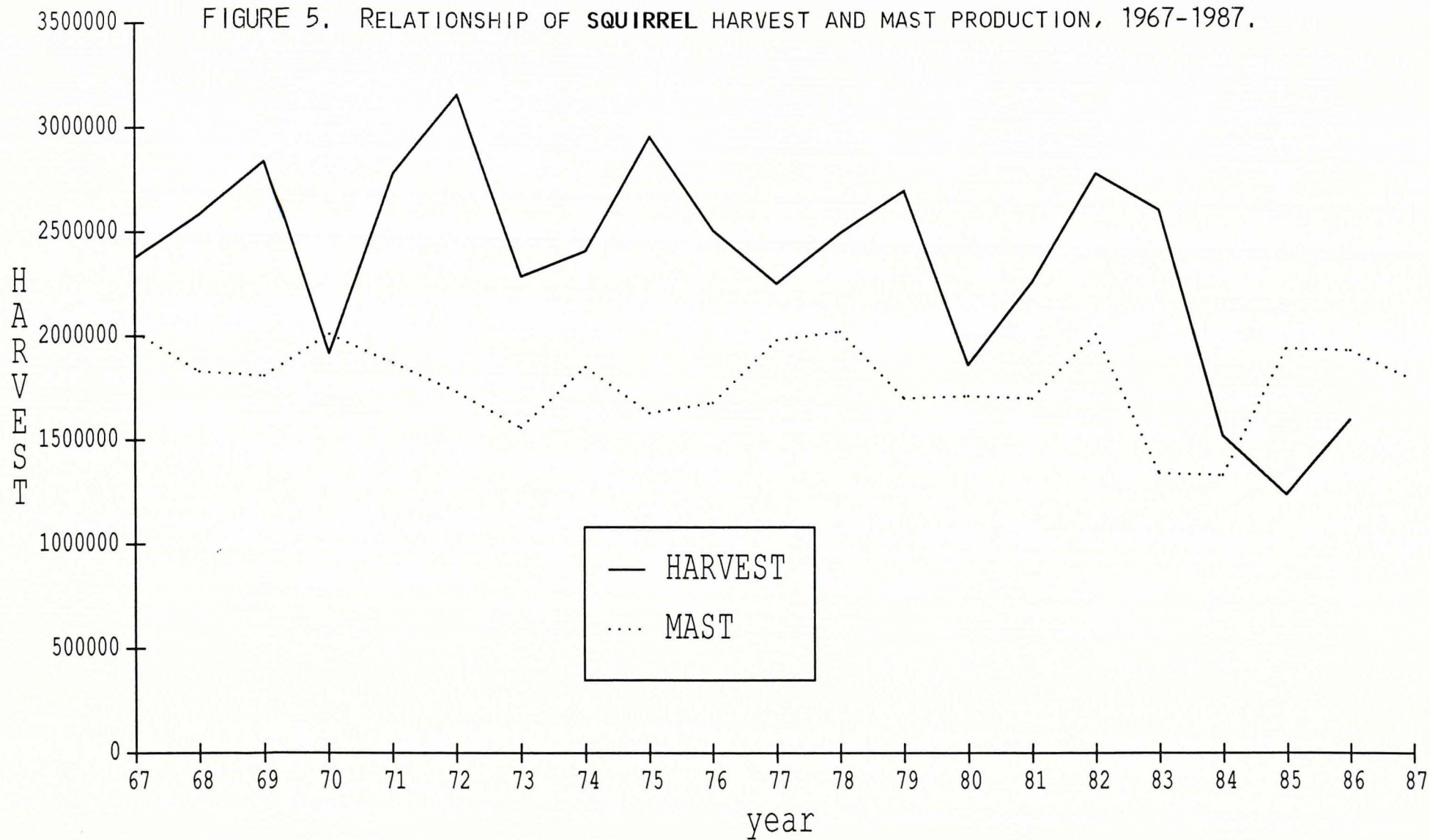




TABLE 5. Regional **squirrel** harvest summary, 1987.

REGION	Ave. Time Per Hunt	% Fox	% Gray	% Juv.	SQUIRRELS BAGGED PER HOUR			
					AVERAGE			
					1987	1986	1985	1984
<b>PRAIRIE</b>								
N. Prairie	2.1	52.7	47.3	46.1	1.4	1.4	1.4	1.2
W. Prairie	1.8	50.2	49.7	52.5	2.2	2.0	1.9	2.0
<b>FOREST</b>								
Lindley Breaks	2.5	65.3	34.7	50.7	1.4	1.3	--	--
Union Breaks	2.2	37.1	62.9	55.4	1.5	1.2	--	--
Oz. East	2.7	30.2	69.8	60.1	1.3	1.1	--	--
Oz. West	2.2	53.7	46.3	67.4	1.8	1.6	--	--
Oz. Border	2.5	69.0	31.0	55.4	1.8	1.2	--	--
<b>DELTA</b>								
	2.4	70.3	29.7	53.5	1.2	1.5	1.2	1.0
<b>STATE</b>								
	2.3	49.6	50.4	56.8	1.5	1.3	1.1	1.0

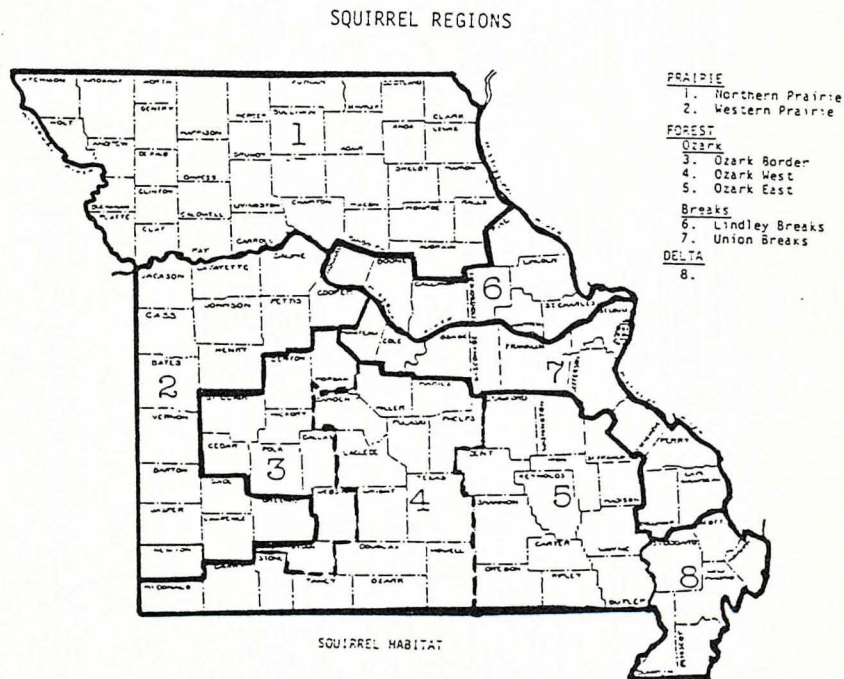


TABLE 6. Squirrel hunting success during two week periods of the 1987 season.

PERIOD	% Harvest	Squirrels Bagged Per Hour	% Adult Females Pregnant & Nursing	% Juveniles
May 23-31	5.3	1.29	26.8	52.5
June 1-15	5.9	1.44	12.0	44.6
16-30	3.4	1.29	3.4	54.9
July 1-15	2.4	1.12	26.6	58.5
16-31	2.0	1.24	31.0	52.8
Aug. 1-15	8.6	1.60	19.3	61.5
16-31	13.5	1.60	13.8	58.2
Sept. 1-15	17.6	1.67	16.6	62.0
16-30	12.4	1.53	21.5	60.3
Oct. 1-15	10.0	1.56	13.3	57.9
16-31	10.5	1.70	5.4	55.0
Nov. 1-15	3.6	1.47	0.0	43.7
16-30	1.2	1.41	0.0	53.2
Dec. 1-15	1.9	1.87	0.0	36.1
16-31	1.1	1.55	0.0	44.1
STATE	100.0	1.54	14.9	56.8



## UPLAND FURBEARERS

Yearly trends of upland furbearer populations are monitored by two annual surveys; the Sign Station Survey and the Archer Furbearer Survey. Both provide regional and statewide indices of population abundance that serve as valuable long-term trend indicators.

Sign station indices (Figures 6 and 7) are determined from furbearer visits to scent stations. The technique includes 24 September-monitored survey routes distributed in all eight zoogeographic regions. Indices are calculated based upon the number of visits by a particular species and the total number of operable scent stations. Archer Furbearer Indices (Figures 8-13) are determined from wildlife sightings by cooperating archery deer and turkey hunters and are expressed as the number of sightings per 1000 hours of hunting.

Upland furbearer populations undergo periodic population fluctuations. A severe winter during 1983 and subsequent acorn mast failures in 1984 and 1985 reduced prey populations in the Ozarks and may have been responsible for a decline in gray fox populations that has only now begun to recover. Other predator populations declined at the same time but have recovered. In fact, statewide indices for coyotes are at record levels, and all indications are that raccoons and opossums are also at or near record levels. Both surveys are conducted during the fall and 1988 data will be available at a later date.



FIGURE 6. VISITS TO SIGN STATIONS BY **STRIPED SKUNK**, **RACCOON**, AND **OPOSSUM**, 1977-1987.

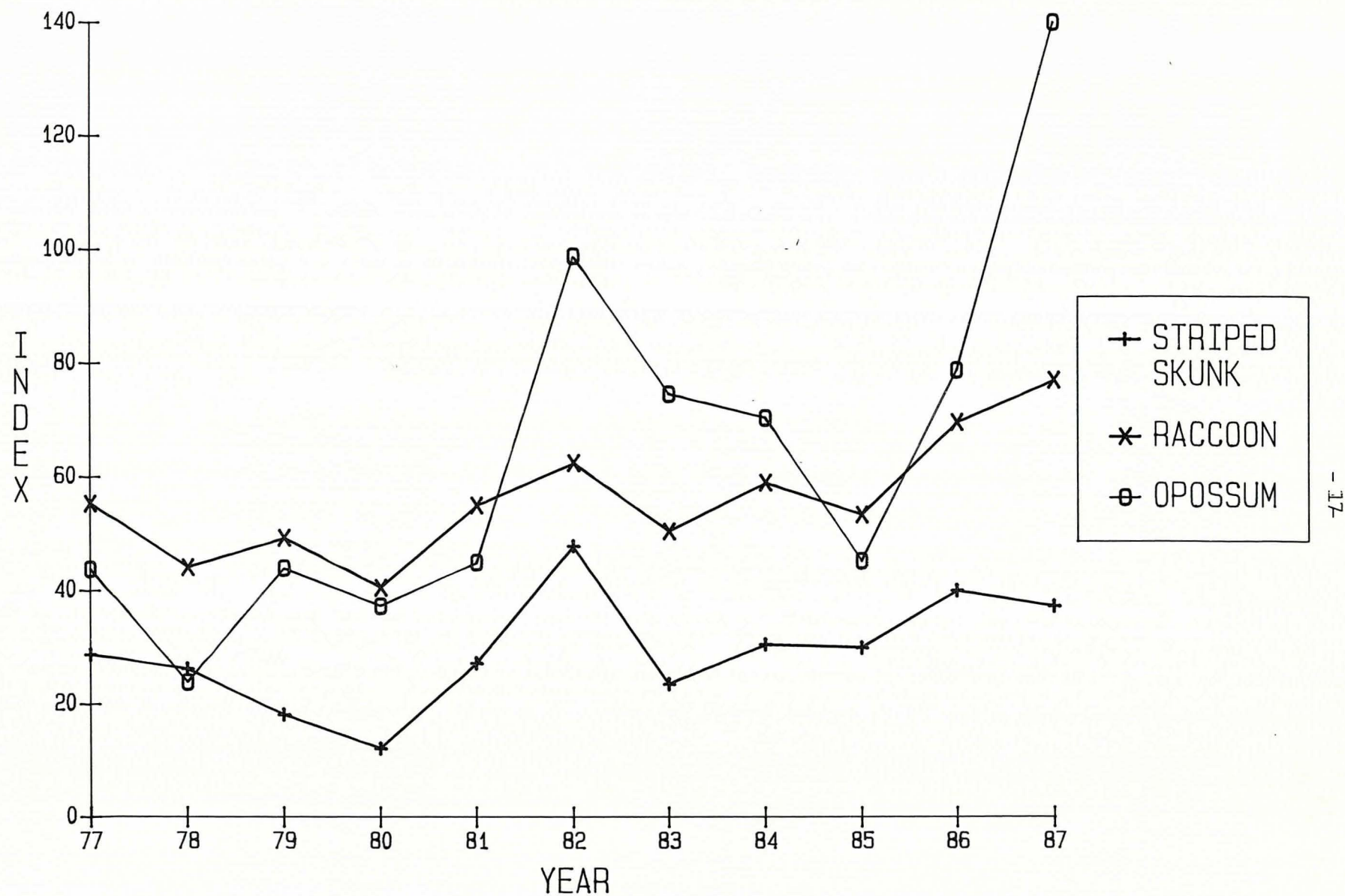




FIGURE 7. VISITS TO SIGN STATIONS BY **COYOTE**, **RED FOX**, AND **GRAY FOX**, 1977-1987.

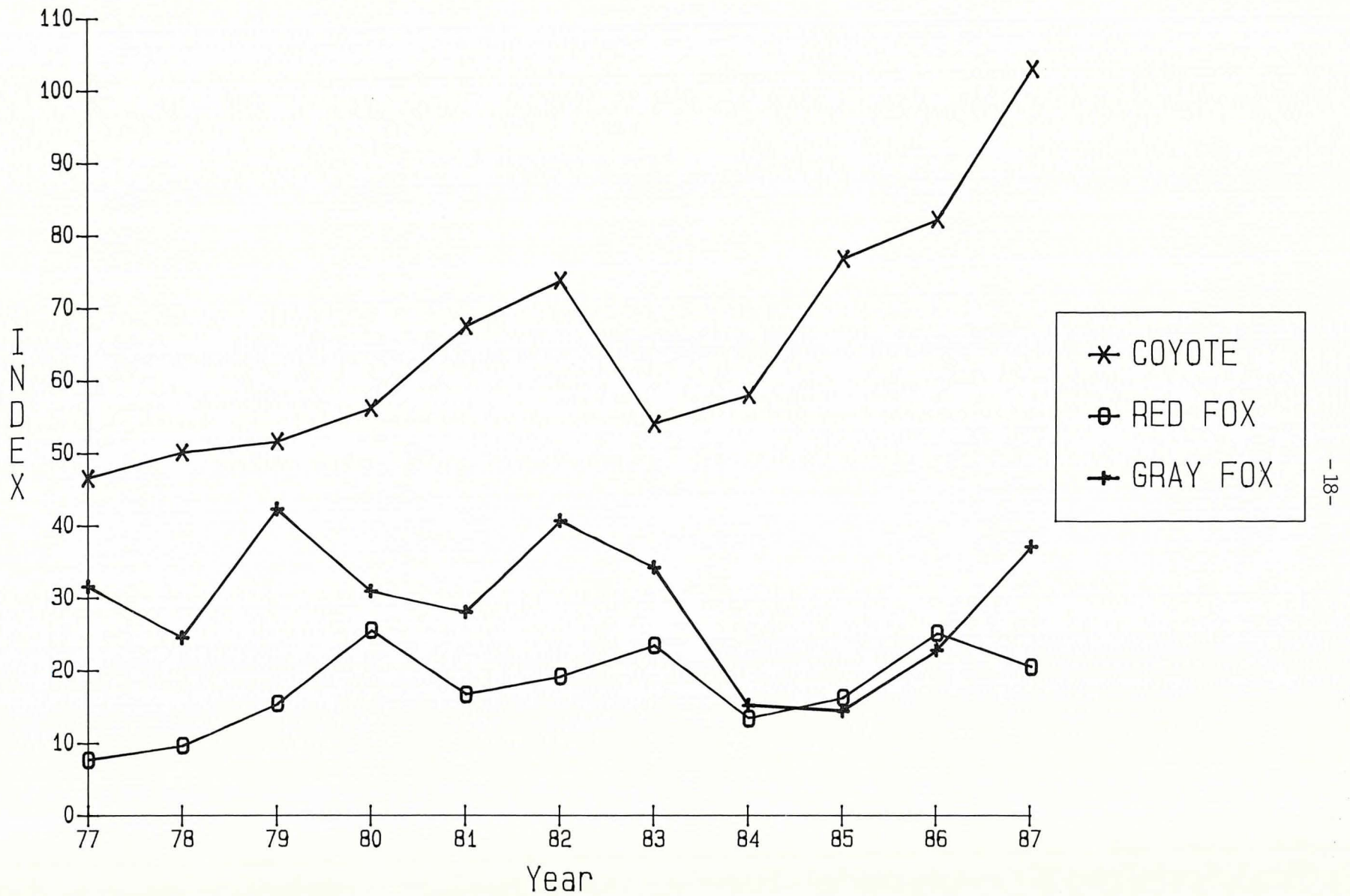


FIGURE 8. STATEWIDE ARCHER **FURBEARER** INDEX SUMMARY, 1983-1987.

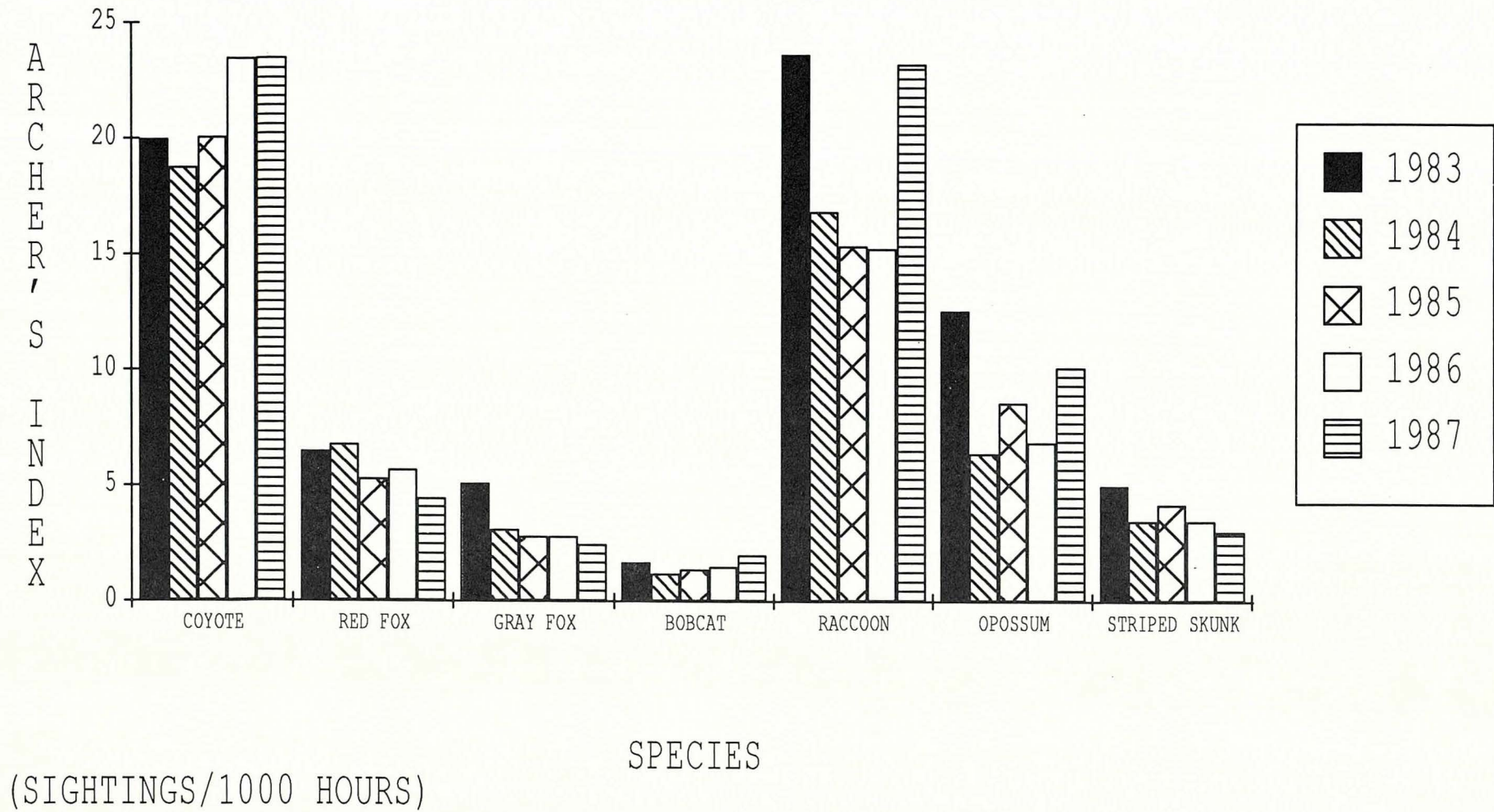




FIGURE 9. REGIONAL TRENDS OF **RACCOON** SIGHTINGS BY COOPERATING ARCHERS, 1983-1987.

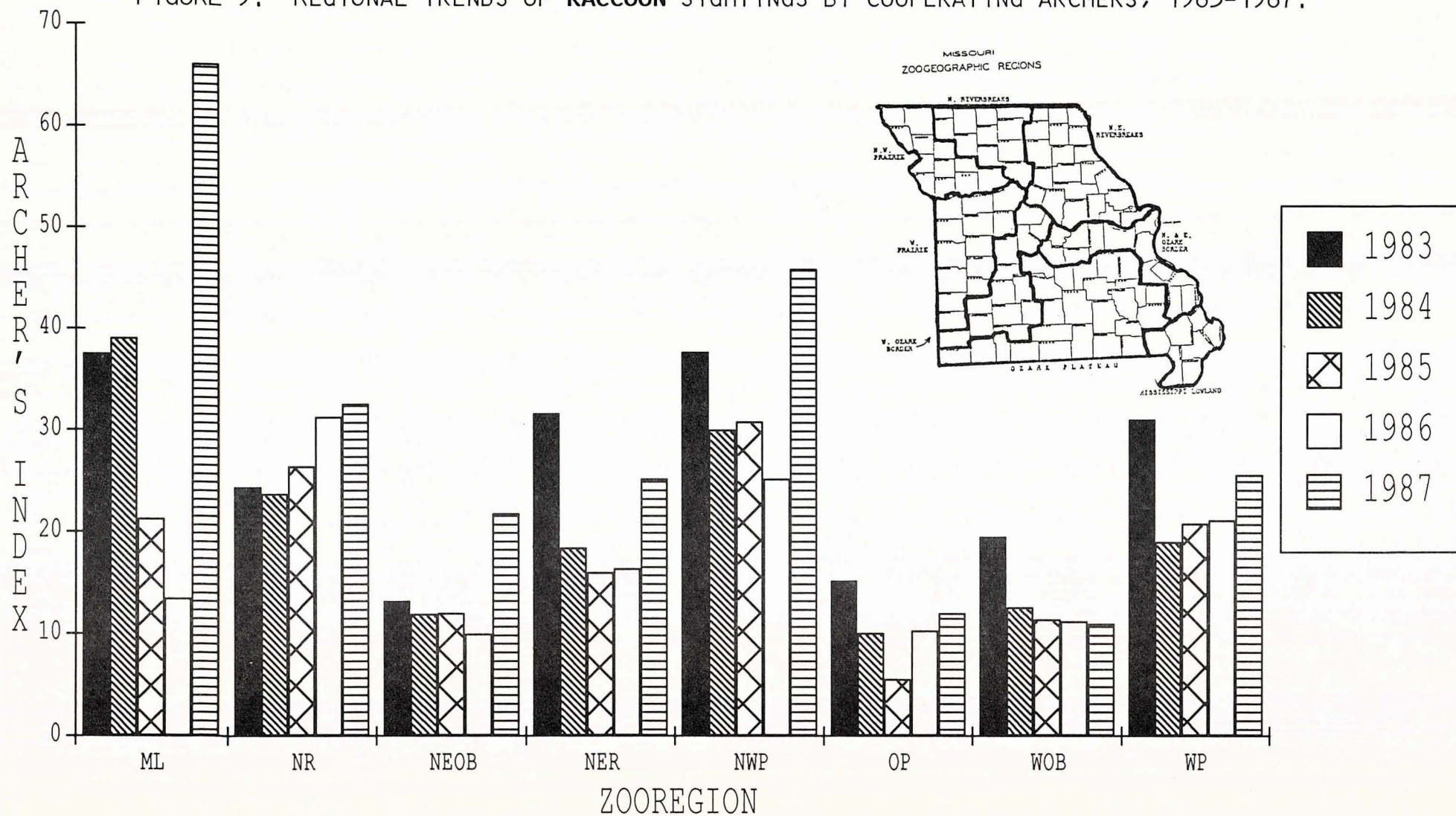


FIGURE 10. REGIONAL TRENDS OF **RED FOX** AND **COYOTE** SIGHTINGS BY COOPERATING ARCHERS, 1983-1987.

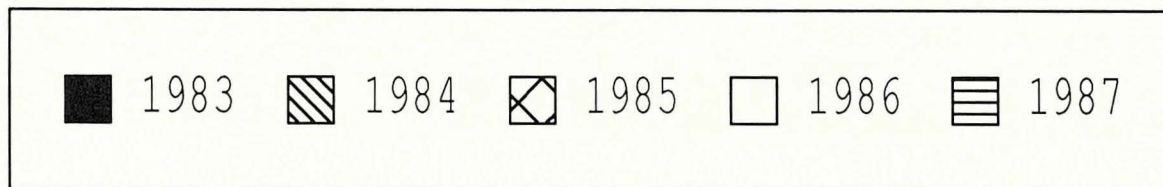
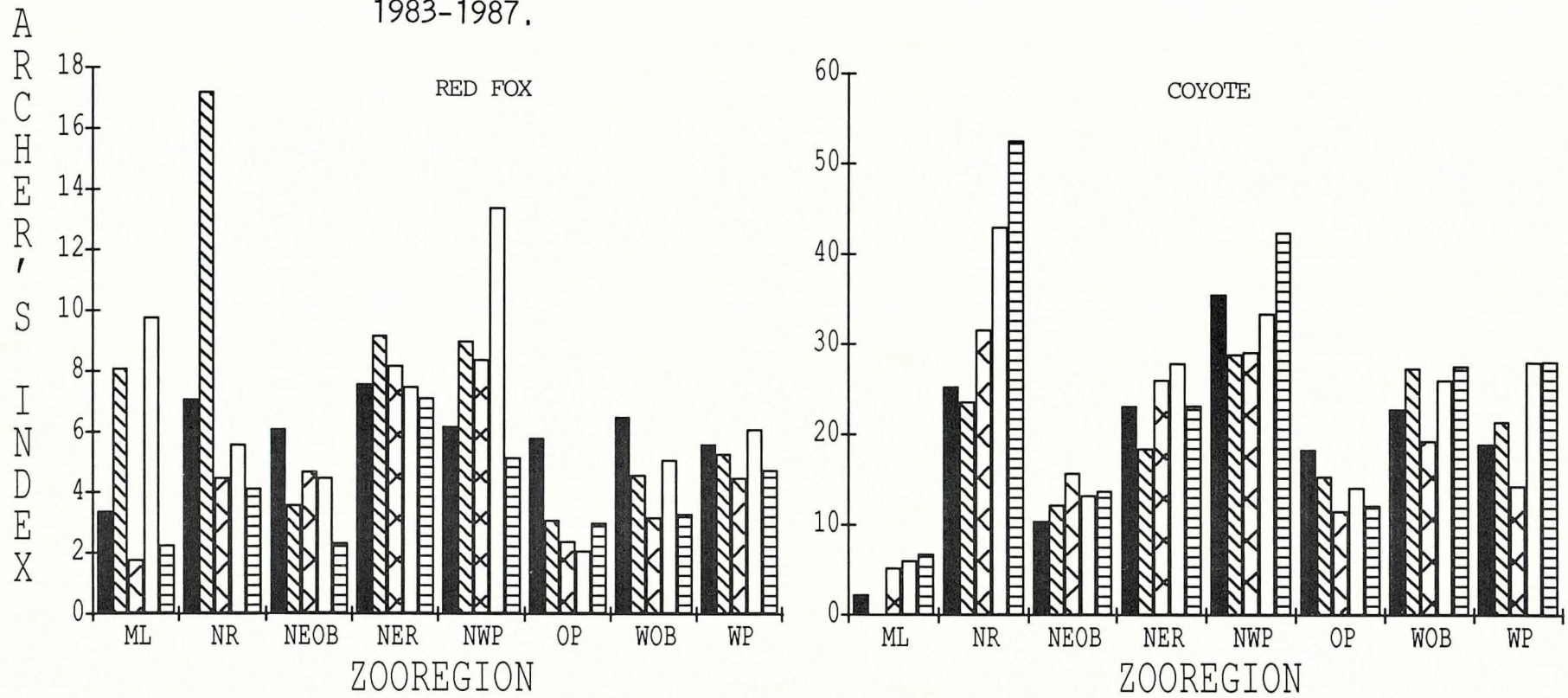




FIGURE 11. REGIONAL TRENDS OF **GRAY FOX** AND **BOBCAT** SIGHTINGS BY COOPERATING ARCHERS, 1983-1987.

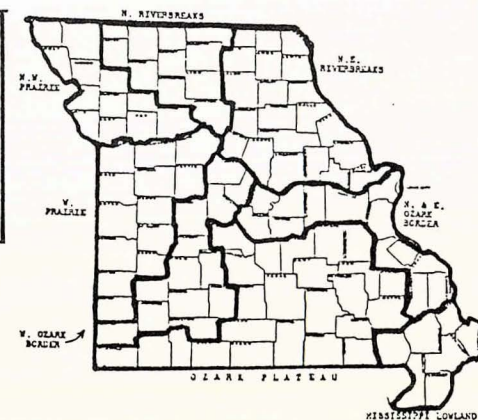
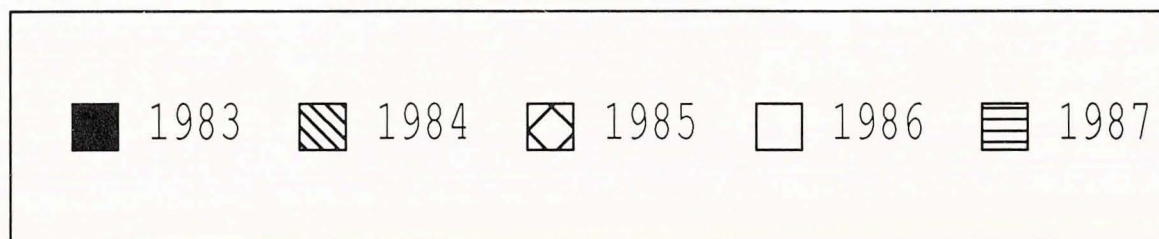
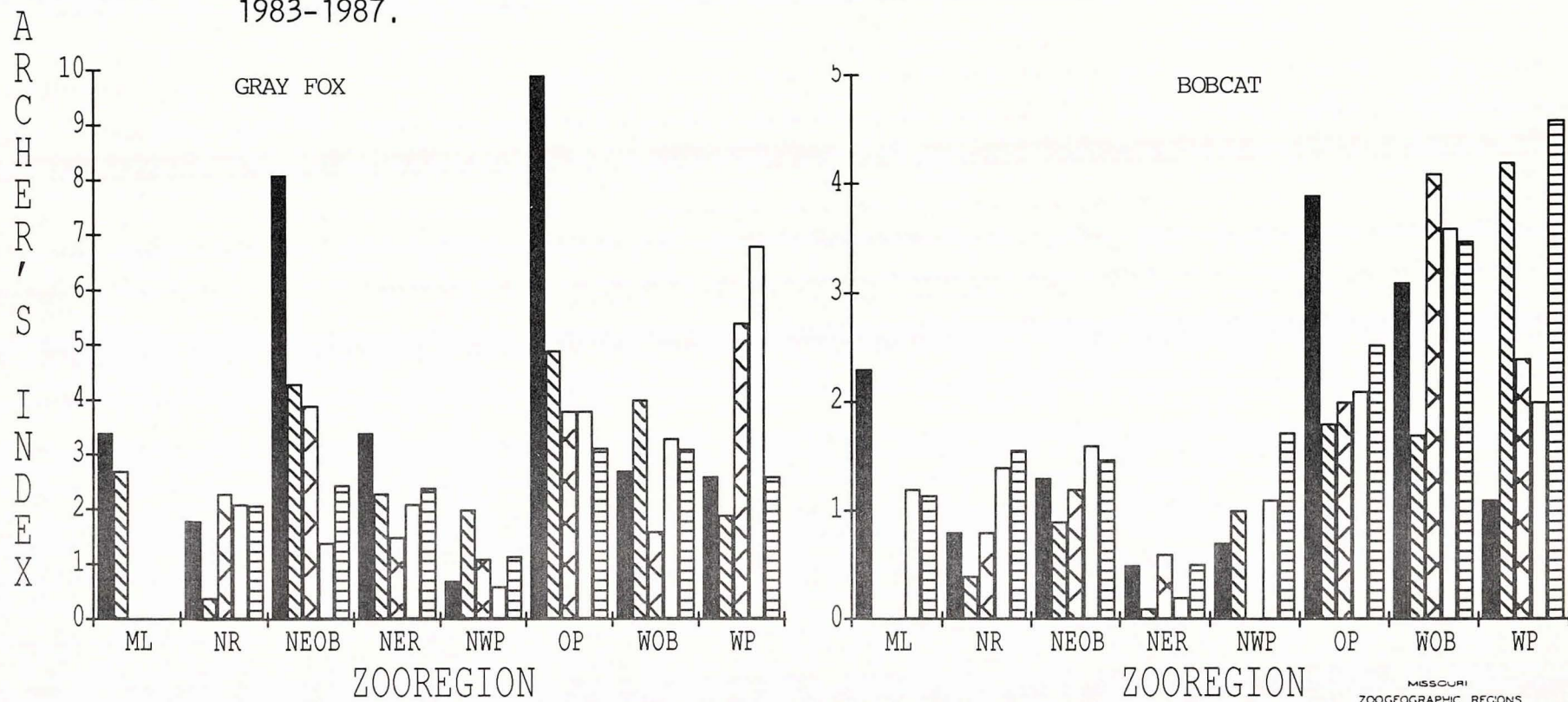


FIGURE 12. REGIONAL TRENDS OF **OPOSSUM** AND **STRIPED SKUNK** SIGHTINGS BY COOPERATING ARCHERS, 1983-1987.

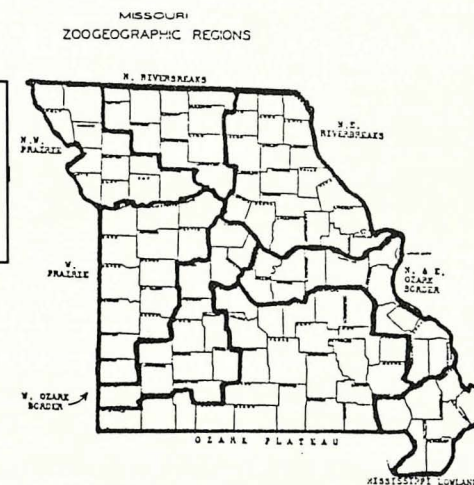
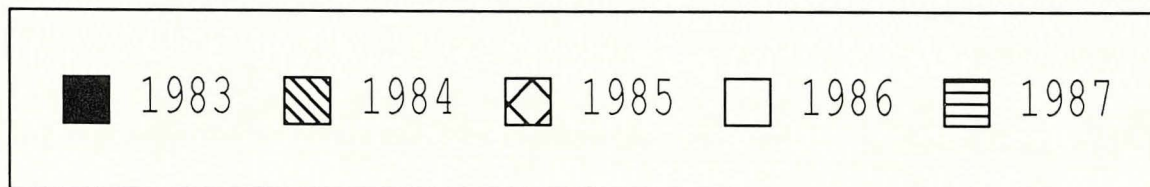
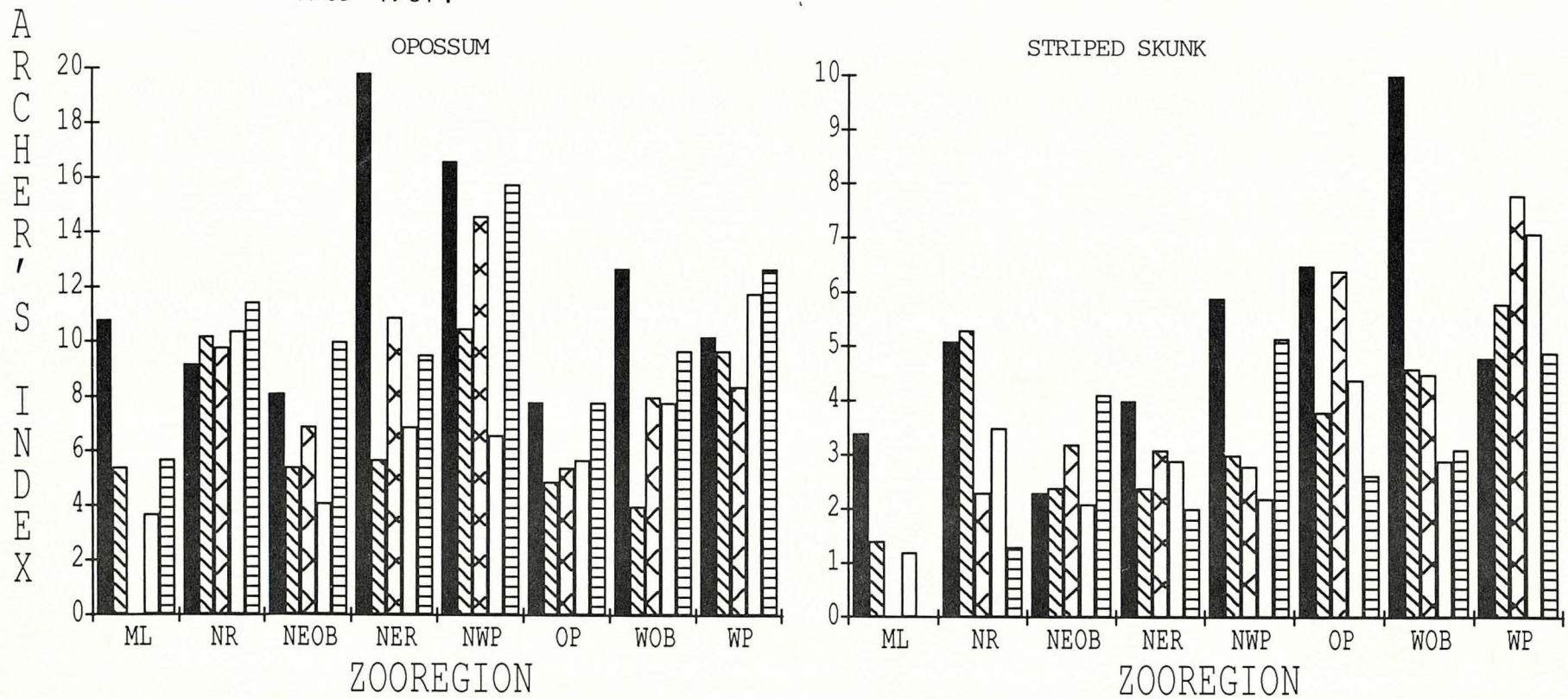
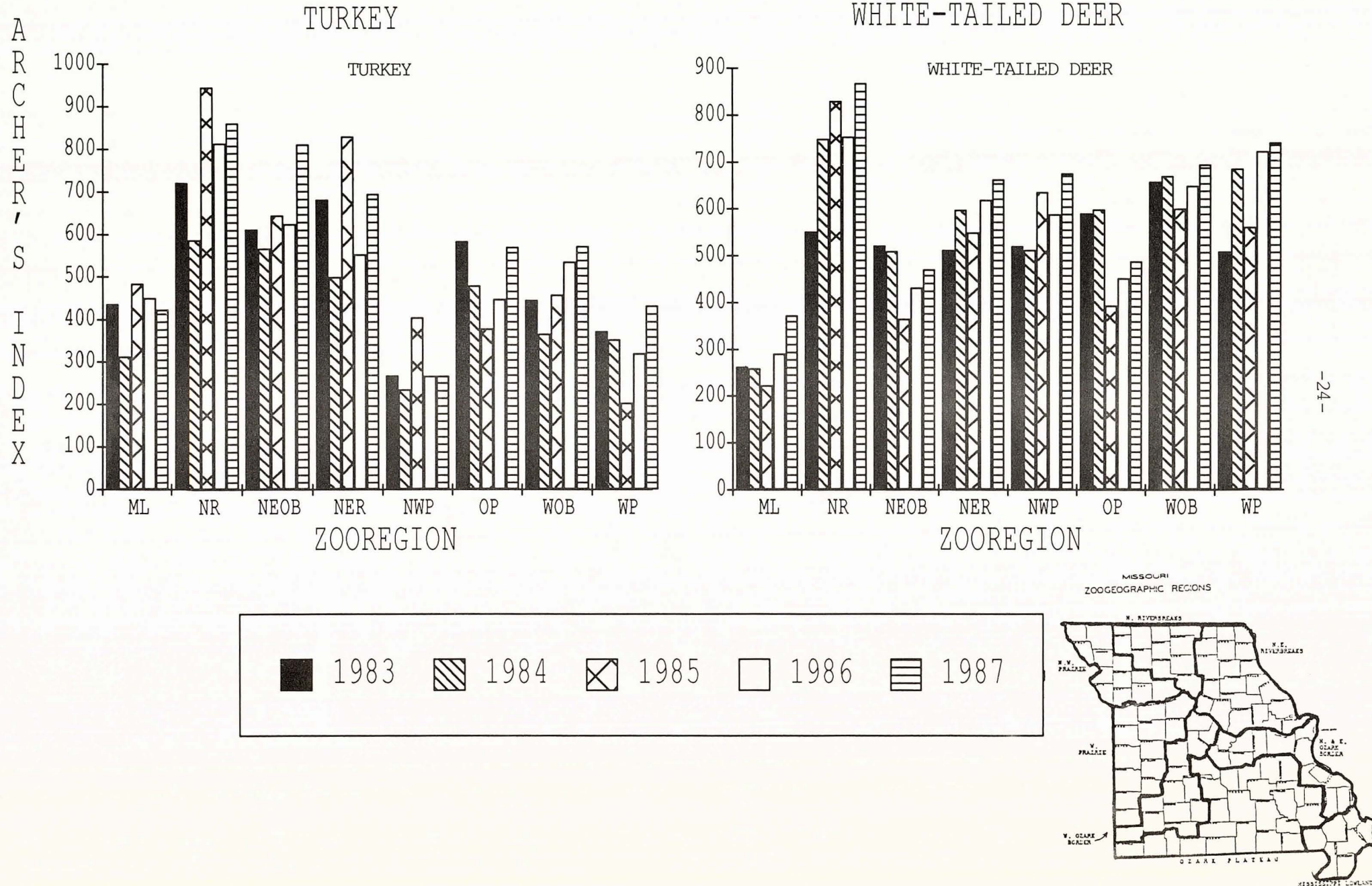




FIGURE 13. REGIONAL TRENDS OF **WILD TURKEY** AND **WHITE-TAILED DEER** SIGHTINGS BY COOPERATING ARCHERS, 1983-1987.



## BOBWHITE QUAIL

Since 1983, conservation agents have surveyed quail along pre-established 30-mile routes annually during August 1-15. In 1988, the statewide mean quail count (13.4 quail per route) was 23% lower than in 1987. The production index dropped from 1.2 to 1.0 broods per route (Table 7). Although the drought may have reduced quail populations, the survey may have underestimated quail density; many surveyors felt that a lack of dew reduced quail activity near roads. Because this survey has been conducted for only 6 years, its reliability in predicting quail harvest is not completely certain. However, Figure 14 shows that the survey indices may be of some value.

Surveys of quail hunters provide statewide estimates of harvest and hunting effort and give insight into long-term population trends. The number of quail harvested and quail hunters have declined 57 and 39%, respectively, between 1967 and 1987.

Hunter cooperators document each of their quail hunts and provide information such as party size, hours hunted, coveys flushed and birds killed. These data are used to determine a hunting success index, calculated as the number of hours hunted per covey flushed. An hour per covey is considered excellent hunting, 2 hours per covey average, and 3 hours per covey poor. The quality of quail hunting has steadily increased since 1984-85 (Table 8), the hunting season following the harsh winter of 1983-84. The outlook for 1988 is favorable.





TABLE 7. Production indices (average number of broods per 30-mile route) from the August **bobwhite quail** roadside survey, 1983-88.

Region	PRODUCTION INDEX					
	1983	1984	1985	1986	1987	1988
Northwest Prairie*	0.8	0.2	0.6	0.9	1.2	1.2
Northern Riverbreaks*	0.9	0.3	0.8	0.9	1.7	1.0
Northeastern Riverbreaks	1.0	0.5	0.8	1.1	1.4	0.7
Western Prairie	1.4	0.3	1.3	2.5	2.4	2.8
Western Ozark Border	0.9	0.5	0.2	0.8	0.9	0.8
Ozark Plateau	0.5	0.2	0.2	0.5	0.5	0.6
Northern & Eastern Ozark Border	0.5	0.1	0.7	0.4	0.4	0.3
Mississippi Lowland	0.9	0.5	0.4	0.4	1.0	0.5
<b>STATEWIDE</b>	0.9	0.3	0.6	0.9	1.2	1.0

\*As of 1987, 2 survey routes are run in counties within pheasant breeding range in the indicated zoogeographic regions.

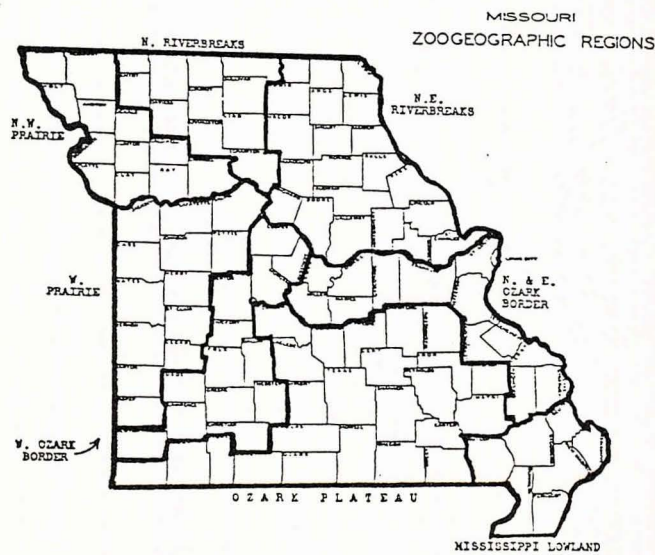


FIGURE 14. RELATIONS BETWEEN PRODUCTION (P.I. = AVERAGE NUMBER OF **BOBWHITE QUAIL** BROODS PER 30-MILE ROUTE) AND TOTAL QUAIL HARVESTED (IN MILLIONS).

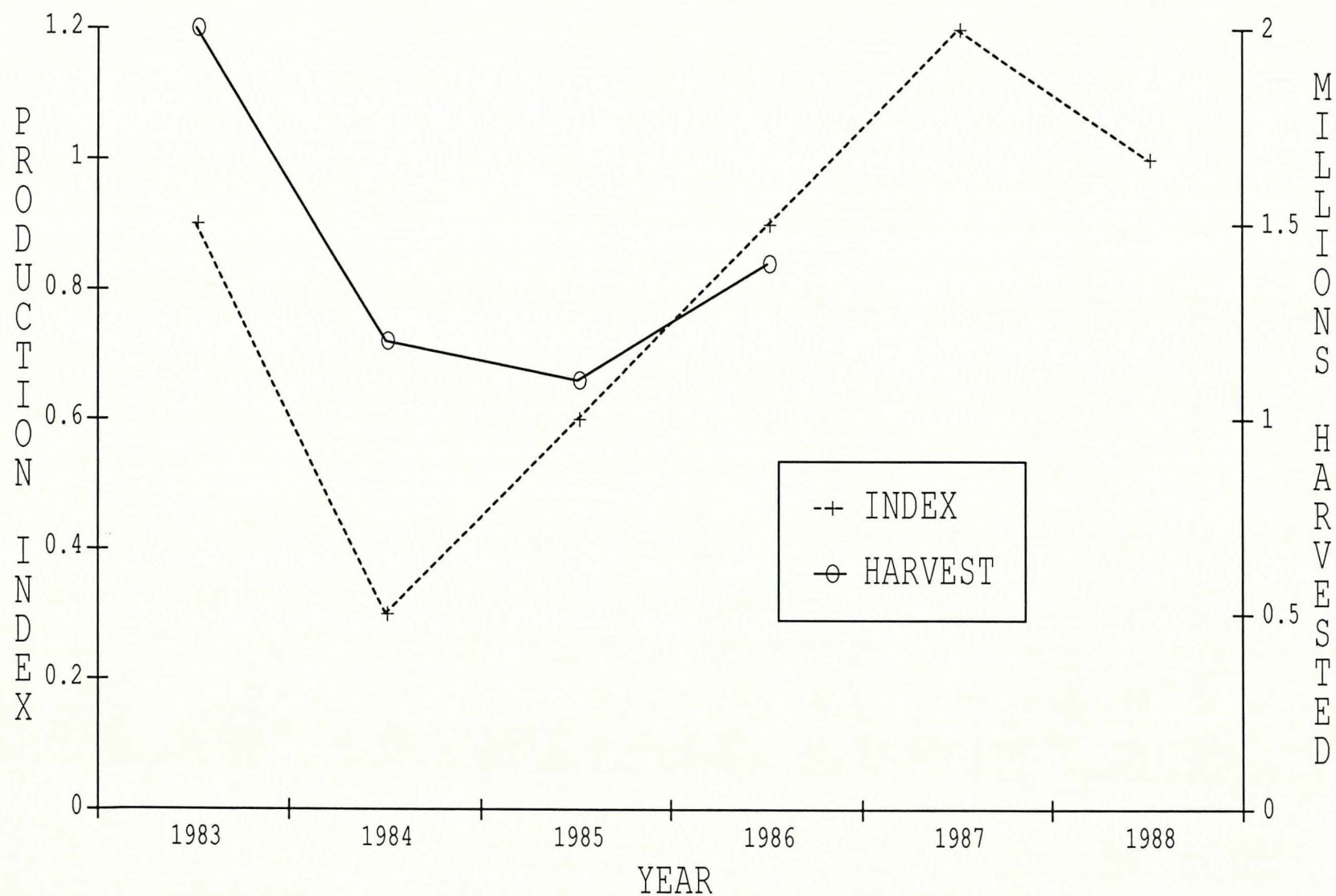
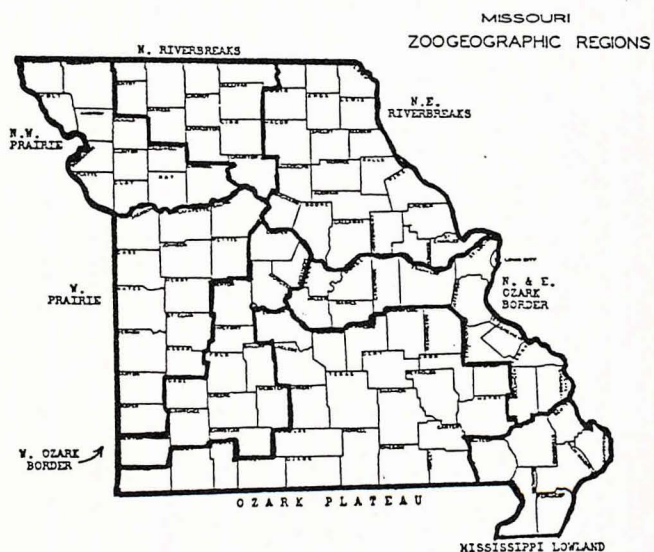




TABLE 8. **Bobwhite** quail hunting indices (no. hours/covey flushed) from quail hunter-cooperator surveys, 1983-88.

Zoogeographic Region	NUMBER OF HOURS PER COVEY FLUSHED				
	1983-84	1984-85	1985-86	1986-87	1987-88
Northwest Prairie	1.1	1.3	1.1	1.1	1.0
Northern Riverbreaks	1.0	1.2	1.0	1.1	0.9
Northeastern Riverbreaks	1.2	1.7	1.5	1.4	1.2
Western Prairie	1.0	1.4	1.2	1.2	1.1
Western Ozark Border	1.1	2.0	1.6	1.6	1.3
Ozark Plateau	1.1	3.0	2.8	1.8	1.4
Northern & Eastern Ozark Border	1.3	1.8	1.5	1.6	1.7
Mississippi Lowland	1.4	1.5	1.8	1.7	1.4
STATEWIDE	1.1	1.6	1.4	1.3	1.2



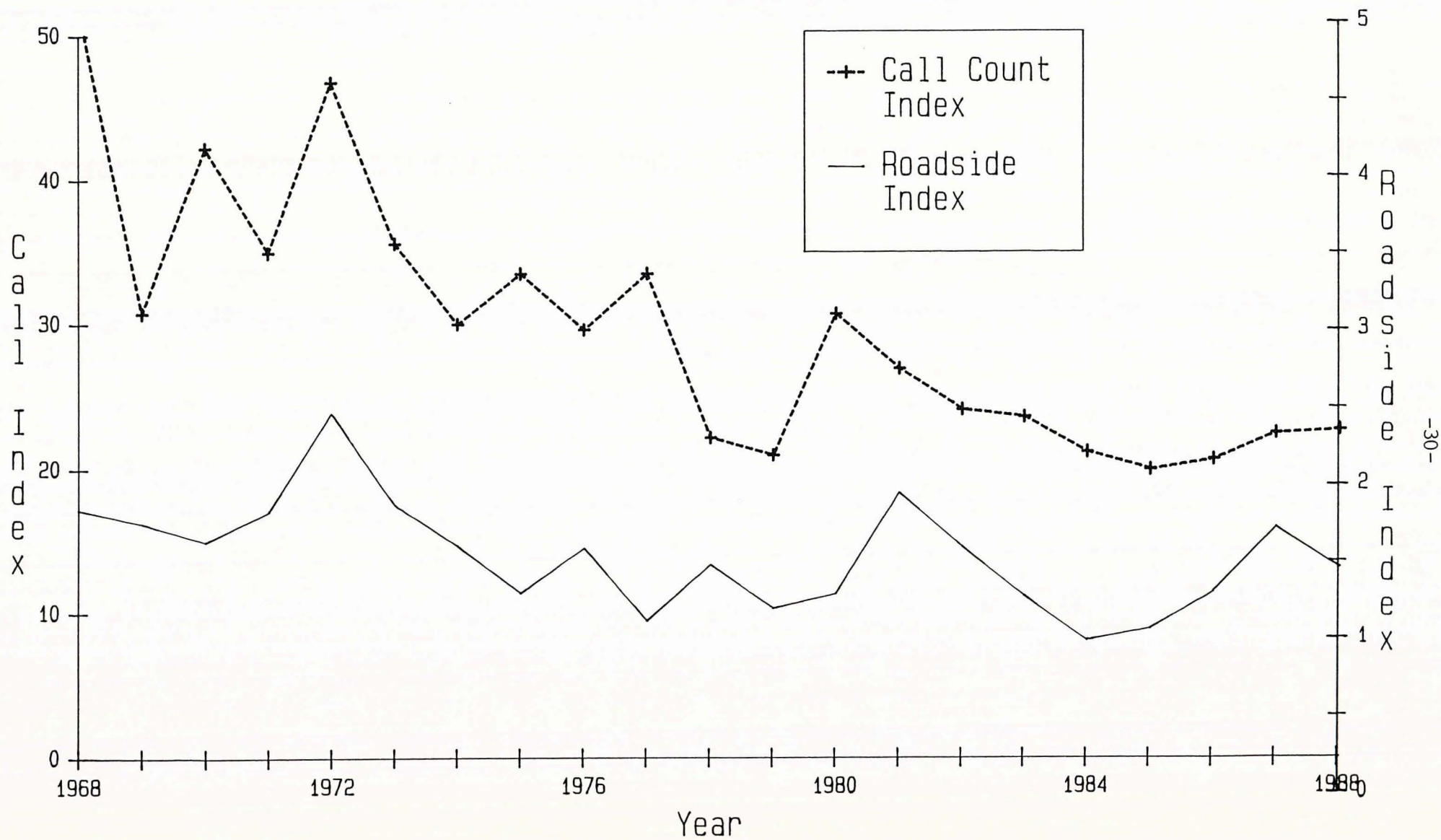


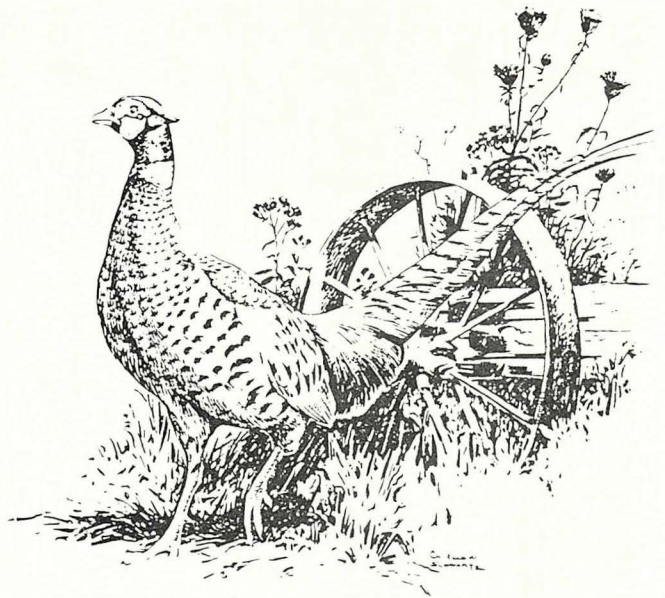
**MOURNING DOVE**

The Department annually assists the U.S. Fish and Wildlife Service in conducting the breeding dove call-count in May. The number of doves heard calling along 20-mile standard routes is averaged to calculate a call-count index. The Department then completes a more intensive dove census in June. Birds observed along 20-mile routes in 111 counties are counted to determine a spring status indicator. The roadside index is the mean number of doves per mile. Between 1987 and 1988, the call-count index increased while the roadside index remained stable (Figure 15). Fall dove populations are comparable to those during the past four years. Hunting prospects look bright because of the expected increased in corn that will be cut for silage.



FIGURE 15. **MOURNING DOVE** CALL COUNT AND ROADSIDE INDICES, 1968-1988.



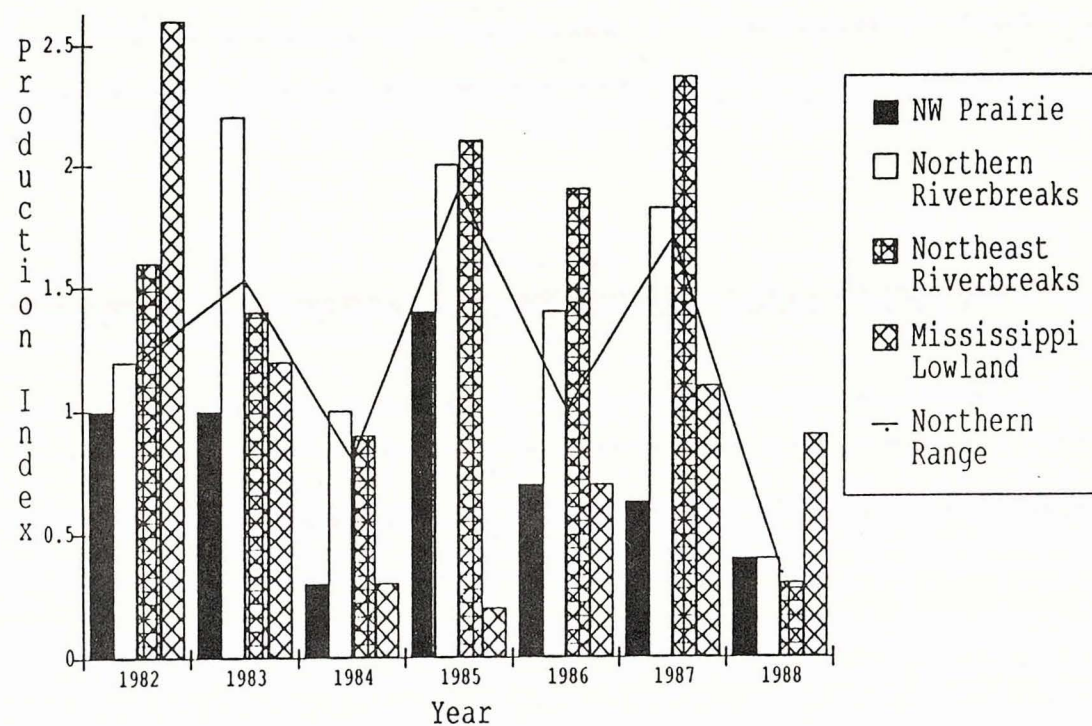


### **RING-NECKED PHEASANT**

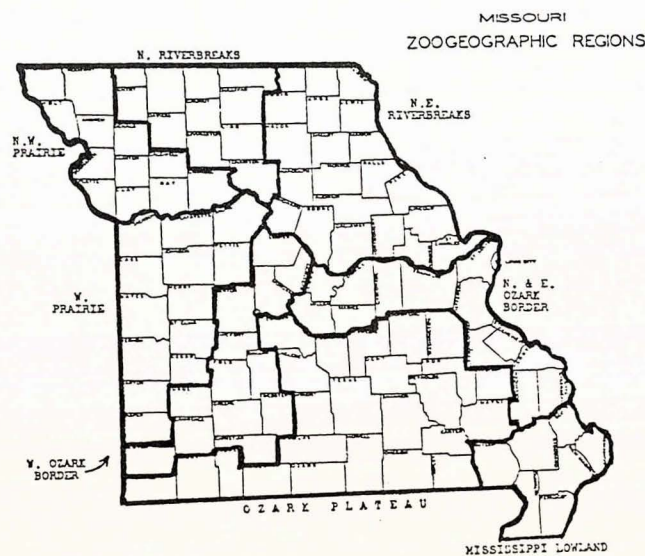
Late summer (August 1-15) roadside surveys are conducted by conservation agents along 30-mile routes in 112 Missouri counties in conjunction with quail surveys. Observers record the number of cocks, hens with broods, hens without broods, and number and age of chicks they observe. The mean number of pheasant broods seen per 30 miles provides a production index (P.I.) and is our best indicator of fall pheasant populations. This survey has been operated since 1979 and indexes have been calculated for northern Missouri zoogeographic regions (Figure 16). The statewide index is used to understand the status of fall pheasant populations prior to the hunting season. For 1988, the statewide P.I. is 0.4, a 69% decrease from 1987. Hunters in the upcoming pheasant hunting season will find fewer birds in northwestern Missouri but similar numbers of birds in the north-central and eastern parts of the state.



FIGURE 16. **RING-NECKED PHEASANT** PRODUCTION INDEX, BROODS PER 30 MILES, BY ZOOGEOGRAPHIC REGION IN MISSOURI, 1982-1988.



NWP = Northwestern Prairie  
 NR = Northern Riverbreaks  
 NER = Northeastern Riverbreaks  
 WP = Western Prairie  
 ML = Mississippi Lowland



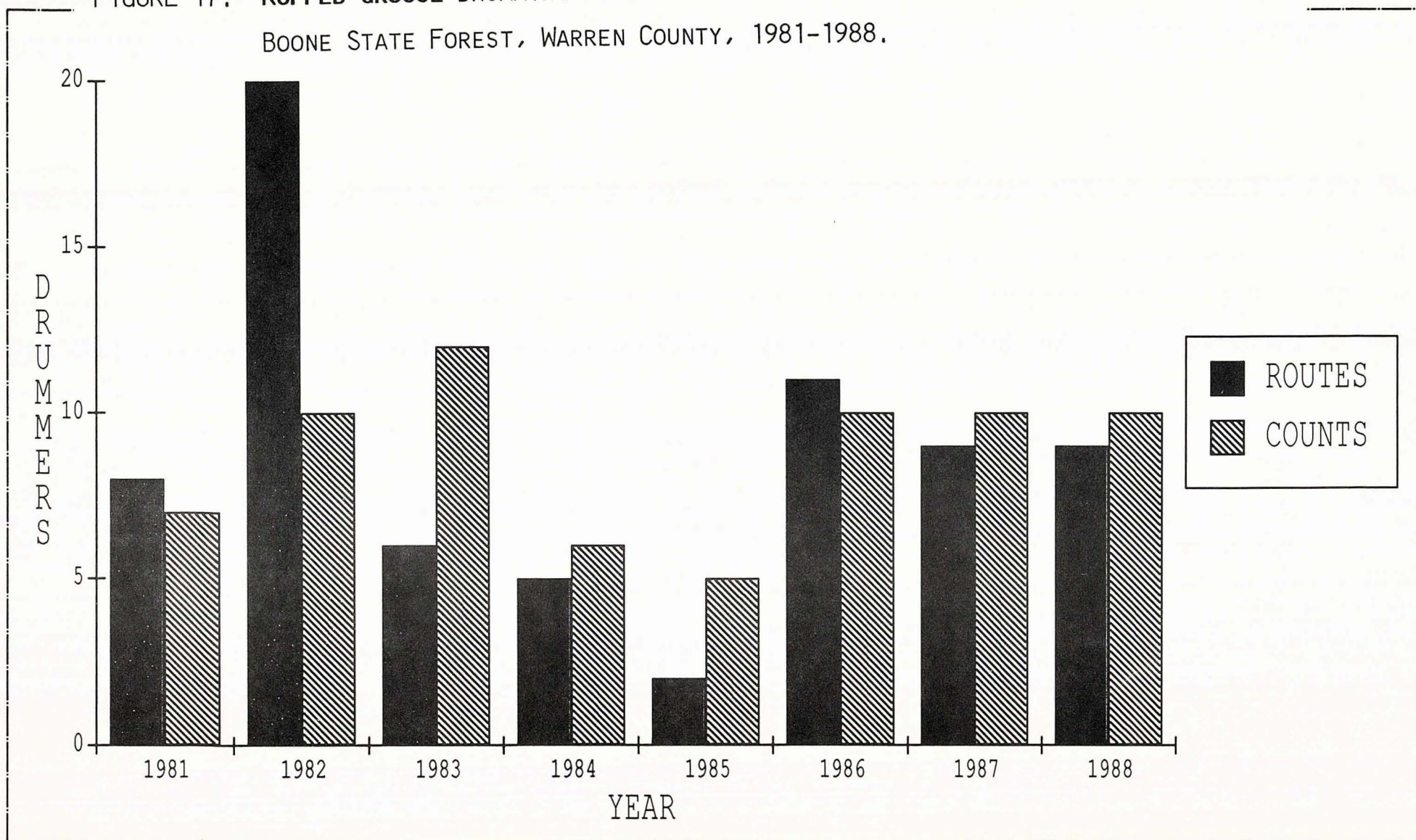
### RUFFED GROUSE



Ruffed grouse population trends are monitored through spring drumming counts. Two types of counts are conducted, drumming routes and complete area counts. Complete area counts are censuses of 1000 acre tracts in which all drumming grouse on the tract are located. Drumming routes function as more of an index and exhibit greater annual variation. Within the grouse hunting zone, densities on the Daniel Boone State Forest can be used to predict fall hunting conditions. Densities were generally stable in 1988 (Figure 17). This is encouraging in that the grouse season was extended in 1987 to January 15th and a minimum of 48 grouse were harvested on the Daniel Boone State Forest. If this level of harvest impacted spring densities we would have expected a decline in numbers on the Boone Forest. Therefore, it appears that 1988 spring populations on the Boone Forest are similar to those in 1987. Assuming normal production this past spring, prospects for the 1988 grouse season are excellent. Grouse hunters also are becoming more proficient at their sport. In 1983 (Table 9) hunters averaged 62 hours per bird bagged. By 1987, that number had dropped to 15 hours per bird harvested. In addition, total grouse flushed almost doubled from 1986 to 1987.



FIGURE 17. **RUFFED GROUSE** DRUMMING ROUTE AND COMPLETE AREA COUNT INFORMATION FOR DANIEL BOONE STATE FOREST, WARREN COUNTY, 1981-1988.



**TABLE 9. Ruffed grouse hunting season summaries, 1983-1987.**

	1983	1984	1985	1986	1987
Reported Harvest	151	51	42	84	221
Adjusted Harvest	173	58	47	93	262
Permits Sold	2,917	894	663	642	680
No. Hunts	1,779	620	365	325	403
Hours/Flush	3.0	3.6	2.6	1.6	1.2
Total Flushes	1,278	1,003	944	1,556	2,714
Hours/Grouse Bagged	62	63	58	60	15
Total Hours Hunted	10,743	3,649	2,443	2,571	3,371





**WILD TURKEY**

Harvest data and an annual brood survey are used to monitor wild turkey population trends (Tables 10 and 11). Brood survey cards are sent to landowners and Department personnel during June, July, and August. A ratio of the number of poults per hen is calculated from brood observations to provide an index of production. Average production over the last 29 years has been 2.9 poults per hen. Brood observations for 1988 were below average (2.4 poults per hen). However, populations remain high because production over the last 3 years has been well above average in most regions of the state.

TABLE 10. Spring **wild turkey** harvest and poult production data, 1960-1988.

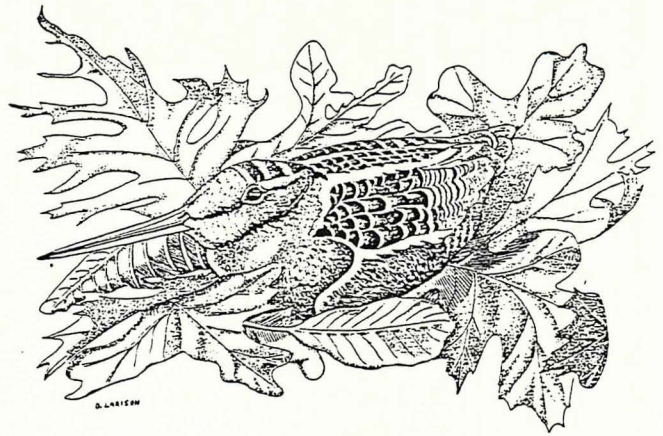
Year	No. Of Turkeys Killed	No. Of Permits	% Success	No. Of Counties Open	Length Of Season	% Subadult	Summer Poult:Hen Ratio
1959	--	--	--	--	--	--	2.3:1
1960	94	698	12	14	3 Days	23	0.8:1
1961	154	1,001	13	14	3 Days	8	2.8:1
1962	182	1,408	12	16	3 Days	28	2.3:1
1963	357	1,828	18	19	4 Days	23	2.4:1
1964	369	2,961	11	22	4 Days	24	1.7:1
1965	476	2,982	15	25	4 Days	17	3.2:1
1966	576	4,873	11	29	5 Days	33	2.2:1
1967	1,191	6,702	17	32	7 Days	22	2.2:1
1968	1,270	8,078	15	35	5 Days	22	2.3:1
1969	959	7,616	12	38	5 Days	23	2.9:1
1970	1,607	10,073	15	41	7 Days	29	3.3:1
1971	2,864	12,311	23	44	11 Days	34	4.6:1
1972	4,457	20,077	22	53	14 Days	47	2.8:1
1973	5,739	29,639	17	63	13 Days	28	1.7:1
1974	5,291	26,374	18	67	13 Days	17	3.3:1
1975	5,546	28,619	18	74	14 Days	34	4.0:1
1976	7,851	34,652	19	79	14 Days	41	2.2:1
1977	9,974	36,599	23	86	14 Days	22	4.2:1
1978	10,146	41,909	20	89	14 Days	54	3.8:1
1979	13,741	42,136	26	90	14 Days	38	3.8:1
1980	16,722	55,565	26	93	14 Days	35	3.5:1
1981	22,319	60,610	31	99	14 Days	25	3.6:1
1982	17,744	67,174	24	100	14 Days	37	3.1:1
1983	19,063	73,262	22	101	14 Days	25	2.4:1
1984	19,568	76,060	21	104	14 Days	22	2.4:1
1985	24,770	69,950	25	114	14 Days	35	4.3:1
1986	30,965	77,611	32	114	14 Days	45	3.6:1
1987	35,951	85,723	33	114	14 Days	28	3.3:1
1988	33,192	93,201	31	114	14 Days	29	2.4:1



TABLE 11. Fall **wild turkey** harvest information, 1978-1987.

Season	Total Harvest	No. Of Permits	Length Of Season	No. Of Counties Open	% Immatures
1978	4,374 108*	16,072	12	40	57.5
1979	9,387 348*	25,414	15	65	61.0
1980	9,418 411*	32,093	14	65	44.0
1981	9,293 405*	32,259	14	73	65.7
1982	8,989 349*	32,051	14	84	55.9
1983	12,407 575*	39,160	14	86	54.0
1984	10,230 456*	34,375	14	86	56.0
1985	12,181 624*	36,218	14	86	70.0
1986	21,019 454*	46,688	14	89	57.8
1987	28,139 753*	52,922	14	92	63.7

\*Archery Harvest



## WOODCOCK

Woodcock harvest is monitored through the small game harvest survey (Figure 18). Predictions for fall hunting are based primarily on data from northern states. These data include singing ground surveys conducted in the spring breeding season and wing collection surveys, the results of which provide an index to recruitment during the previous year. These data are collected through the U.S. Fish and Wildlife Service. For the 1988 season, the outlook is optimistic as breeding populations continue to increase from a low in 1984. While annual production affects woodcock hunting in Missouri, weather patterns often have a major influence on harvest due to effects on the timing of fall migrations.

Considerable attention is being focused in declining woodcock numbers in the eastern U.S. The long-term declines are thought to be primarily a result of habitat loss. In the central flyway, of which Missouri is a part, the woodcock population index remains at or slightly above the long-term mean. Populations are stable and harvests should remain similar to those in recent years.



FIGURE 18. **WOODCOCK** HARVEST AND HUNTER NUMBERS DETERMINED FROM ANNUAL SMALL GAME HARVEST MAIL SURVEYS, 1972-1986.





**WHITE-TAILED DEER**

Deer management decisions are based on the following information:

1. simulated unit deer populations derived from a computer model  
(Table 11)
2. annual numbers of road-killed deer (Table 12, Figure 19)
3. percentage of any-deer permit holders successful harvesting a deer  
(Table 13)
4. antlered deer harvests (Tables 12 and 13)
5. agent responses to questionnaires concerning county deer herd  
levels and crop damage (Table 12)

Collection methods and limitations of each include:

Simulated Deer Populations

Sex-age specific mortality and reproductive rates and an initial population size are used in a computer modeling program. The initial population size is then varied in repeated simulations until the population size that is selected can sustain known mortality, the largest proportion of



which results from hunting. Once a simulated pre-season population is established, the number of deer that need to be harvested during the hunting season to obtain desired population levels can be determined. The simulated pre-season population should be used with caution because, at this time, limited information is available for some of the input parameters. Modeling, in conjunction with information from population indices, will serve as the basis for setting any-deer/bonus quotas in the future.

#### Road-killed Deer

Data from road-killed deer are obtained from 2 sources, the Missouri Highway and Transportation Commission which picks up approximately 1/3 of the reported road-killed deer, and MDC agents who account for most of the remainder. The road kill trend indicator can be (and has been) biased by inconsistent collection procedures. Statewide, however, numbers of roadkills parallel harvests closely. We have made efforts to standardize data collection procedures and expect that future road-kill data will be a useful trend indicator by deer management unit.

#### Any-deer Hunter Success

Hunter success rates are a reflection of deer abundance. Weather may affect deer harvest on any one day, however, over an entire season, poor days are generally compensated for by good days, making these effects minimal overall. Relative progress of the corn harvest can impact hunter success. During wet falls, delayed corn harvest can leave much standing corn available as escape cover, reducing hunter success. However, in most years, late corn harvests do not occur.

### Antlered Deer Harvest

The biggest problem with antlered deer harvest is that it fluctuates not only with deer abundance but also with hunter numbers. We do not annually collect information on hunter densities in our deer management units, only during years when we conduct a post-season mail survey. As a result, this index is only marginally useful as a deer trend indicator for our deer management units.

### Agent Questionnaires

Questionnaires concerning deer densities and crop depredations are sent annually to conservation agents. Conservation agents are closest to local conditions and have a "feel" for gross trends in the deer population in their respective counties. The agents also handle most crop damage problems. These reports provide useful information but are admittedly subjective evaluations and must be used somewhat cautiously.

Based on the data collected using the methods described above deer hunting prospects for both archers and firearms hunters in 1988 are excellent.



TABLE 11. Simulated growth of **white-tailed deer** herds in the quota deer management units.

Mgmt. Unit	SIMULATED PRESEASON POPULATION SIZE*		Mgmt. Unit	SIMULATED PRESEASON POPULATION SIZE*	
	1987	1988		1987	1988
1	6,733	7,420	30	19,020	19,614
2	13,436	16,743	31	6,074	7,577
3	19,883	22,292	32	13,602	15,054
4	24,549	27,047	33	11,544	13,116
5	18,330	18,000	34	11,361	12,491
6	15,498	15,724	35	6,561	7,808
7	29,247	30,186	36	9,577	10,657
8	4,649	5,717	37	4,612	5,451
9	4,451	5,401	38	9,348	11,167
10	13,959	15,679	39	16,085	18,097
11	4,248	4,950	40	17,726	19,275
12	10,876	11,506	41	15,452	17,238
13	12,775	13,731	43	20,444	23,552
14	11,403	11,966	43	8,384	8,905
15	10,739	12,230	45	2,961	3,309
16	11,791	12,678	46	10,487	10,993
17	13,425	15,053	47	1,465	1,589
18	6,538	7,673	48	11,109	11,752
19	10,303	12,207	49	14,199	15,388
20	7,949	8,130	50	9,281	10,056
21	4,875	4,852	51	18,543	20,824
22	6,833	7,295	52	18,528	19,959
23	12,664	13,032	53	7,729	9,349
24	8,991	9,253	55	11,836	14,252
25	8,169	8,950	56	1,360	1,504
26	18,543	19,300			
27	21,224	22,748			
28	16,042	17,254			
29	33,071	32,774			
			TOTAL	658,482	718,858

\*Simulated population sizes are the number of deer that must be present to sustain estimated mortality. These figures should be used with caution because limited information was available for some of the input parameters.

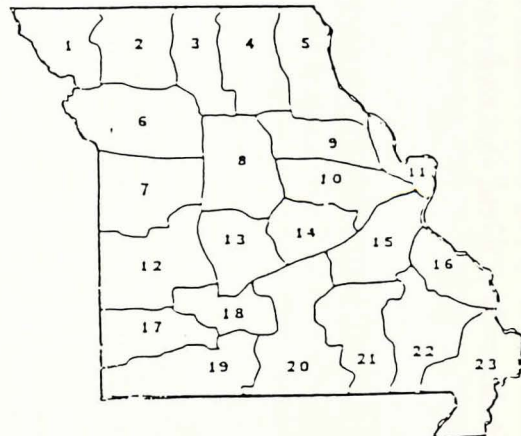


TABLE 12. White-tailed deer population trend indicators by management unit, 1986-1987.

Mgmt. Unit	% HUNTER SUCCESS WITH ANY-DEER PERMITS		AGENT CROP DAMAGE REPORT		Agent <sup>2</sup> Trend Indicator	DOE HARVEST		ANTLERED DEER HARVEST		UNADJUSTED NUMBER OF ROADKILLED DEER	
	1986	1987	1986	1987		1986	1987	1986	1987	1986	1987*
1	52	46	24	29+	I	305	488	588	719	169	224
2	53	55	16	18+	I	424	650	1086	1463	184	197
3	53	57	10	11	I	1556	1691	2464	3127	333	349
4	59	57	16	12	S-I	940	1282	1949	2379	222	220
5	49	44	13	8	I	1396	2182	1678	1917	166	180
6	57	56	18	6	I	1029	1659	1267	1617	148	155
7	49	52	17+	21+	I	2106	2890	2436	3152	275	288
8	38	56	1	1	I	101	136	391	449	168	205
9	58	47	11	4	I	81	132	385	470	130	194
10	45	57	17	22	I	512	803	1379	1795	219	247
11	38	45	15	6	I	116	186	292	401	135	203
12	46	51	3	5	I	579	918	1018	1276	120	105
13	49	52	5	4	I	767	982	1268	1541	214	167
14	48	47	29	4	S-I	713	1029	870	1190	183	157
15	49	49	0	0	I	407	596	904	1121	149	159
16	46	48	4	0	I	717	935	1054	1263	147	185
17	43	47	8	12	S-I	473	834	1297	1457	208	198
18	63	57	4	0	I	71	143	502	739	260	321
19	84	53	32+	4	I	145	286	828	1077	231	249
20	47	44	2	4	I	437	762	648	798	107	108
21	46	42	3	1	I	305	479	470	549	83	67
22	40	41	7	8	I	351	508	515	621	174	137
23	43	44	0	11	I	861	1214	970	1086	71	74
24	33	37	2	5	I	743	771	778	870	147	179
25	39	42	7	3	I	439	538	654	764	72	123
26	41	39	38+	27+	I	1644	1613	1721	1914	179	162
27	44	45	31	21	I	1612	1513	2184	2488	237	311
28	37	41	5	6	I	954	1085	1359	1844	172	279
29	41	40	13	6	I	2343	3081	2188	2777	192	282
30	32	30	10	1	I	1257	1895	1368	1644	250	238
31	63	42	0	2	S-I	97	116	590	530	238	237
32	37	33	13	7	S-I	741	956	1069	1283	289	286
33	45	51	1	0	I	586	684	827	1047	67	112
34	39	40	1	5	I	749	794	967	1116	133	143
35	43	42	5	7	I	173	224	439	561	123	177
36	35	37	15	13	S-I	710	607	881	1054	125	142
37	37	42	2	1	S-I	110	165	277	406	101	117
38	43	45	2	1	I	282	322	759	963	126	180
39	33	39	1	1	S-I	894	919	1328	1736	86	131
40	34	40	5	8	I	1192	1312	1370	1813	95	170
41	51	58	0	0	S-I	208	228	1121	1408	96	148



TABLE 12 (continued):

Mgmt. Unit	% HUNTER SUCCESS WITH ANY-DEER PERMITS		AGENT CROP DAMAGE REPORT		Agent <sup>2</sup> Trend Indicator	DOE HARVEST		ANTLERED DEER HARVEST		UNADJUSTED NUMBER OF ROADKILLED DEER	
	1986	1987	1986	1987		1986	1987	1986	1987	1986	1987*
42	—	—	0	0	I	0	5	457	804	31	49
43	37	45	7	9	S-I	704	1005	1670	2297	182	205
44	35	36	3	2	I	549	730	665	771	133	145
45	40	34	3	1	I	102	175	194	255	59	69
46	37	36	2	5	I	706	865	744	941	96	163
47	26	43	0	1	I	26	40	116	151	107	109
48	29	33	2	5	I	761	873	923	1048	90	143
49	29	34	9	7	I	774	917	981	1441	91	147
50	31	37	0	3	I	569	659	615	1005	56	55
51	34	43	32+	1	I	760	1150	1135	1793	52	77
52	37	43	9	4	I	925	1151	1225	1967	194	258
53	49	62	0	2	S-I	65	52	437	859	18	22
54	—	—	0	0	I	0	0	100	120	14	5
55	29	38	1	6	I	201	245	728	1158	35	83
56	32	52	1	2	I	26	27	106	135	27	23
57	—	—	0	1	S-I	0	0	104	136	10	19
Unknown						0	37	0	76	—	0
STATEWIDE	41	43	475+	354+	—	35,294	45,671	54,339	69,684	8,019	9,378

I = increasing

S = stable deer population

\* Includes deer reported by Missouri Highway & Transportation Dept.

TABLE 13. Results of 1987 firearms deer season by management unit.

Mgmt. Unit	Forest mi <sup>2</sup>	Doe		Buck Fawn Harvest	Buck Fawn		Antlered Buck Harvest	Antlered		Total*	Total Harvest*	
		Doe Harvest	Harvest Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>
1	59.4	480	8.1	169	2.8		719	12.1		1372	23.1	
2	80.9	650	8.0	233	2.9		1463	18.1		2349	29.0	
3	247.8	1691	6.8	684	2.8		3127	12.6		5508	22.2	
4	131.1	1282	9.8	501	3.8		2379	18.1		4164	31.8	
5	247.4	2182	8.8	928	3.8		1917	7.7		5048	20.4	
6	112.0	1659	14.8	728	6.5		1617	14.4		4018	35.9	
7	347.5	2890	8.3	1166	3.4		3152	9.1		7210	20.7	
8	105.9	136	1.3	60	0.6		449	4.2		647	6.1	
9	30.0	132	4.4	54	1.8		470	15.7		657	21.9	
10	126.3	803	6.4	254	2.0		1795	14.2		2853	22.6	
11	56.4	186	3.3	78	1.4		401	7.1		666	11.8	
12	132.0	918	7.0	340	2.6		1276	9.7		2535	19.2	
13	252.0	982	3.9	376	1.5		1541	6.1		2902	11.5	
14	147.7	1029	7.0	425	2.9		1190	8.1		2644	17.9	
15	149.5	596	4.0	264	1.8		1121	7.5		1983	13.3	
16	247.9	935	3.8	364	1.5		1263	5.1		2566	10.4	
17	281.1	834	3.0	288	1.0		1457	5.2		2583	9.2	
18	176.3	143	0.8	65	0.4		739	4.2		949	5.4	
19	156.4	286	1.8	114	0.7		1077	6.9		1479	9.5	
20	178.0	762	4.3	282	1.6		798	4.5		1845	10.4	
21	199.8	479	2.4	176	0.9		549	2.7		1206	6.0	
22	143.9	508	3.5	186	1.3		621	4.3		1318	9.2	
23	273.4	1214	4.4	399	1.5		1086	4.0		2703	9.9	
24	285.1	771	2.7	286	1.0		870	3.1		1929	6.8	
25	168.3	538	3.2	227	1.3		764	4.5		1531	9.1	
26	337.3	1613	4.8	584	1.7		1914	5.7		4115	12.2	
27	746.5	1513	2.0	529	0.7		2488	3.3		4533	6.1	
28	882.3	1085	1.2	424	0.5		1844	2.1		3355	3.8	
29	550.1	3081	5.6	1092	2.0		2777	5.0		6957	12.6	
30	390.2	1895	4.9	644	1.7		1644	4.2		4186	10.7	
31	547.6	116	0.2	42	0.1		530	1.0		688	1.3	
32	478.6	956	2.0	297	0.6		1283	2.7		2541	5.3	
33	165.9	684	4.1	248	1.5		1047	6.3		1983	12.0	
34	316.2	794	2.5	314	1.0		1116	3.5		2230	7.1	
35	177.4	224	1.3	76	0.4		561	3.2		861	4.9	
36	512.0	607	1.2	204	0.4		1054	2.1		1867	3.6	
37	199.1	165	0.8	58	0.3		406	2.0		629	3.2	
38	494.7	322	0.7	88	0.2		963	1.9		1374	2.8	
39	751.6	919	1.2	287	0.4		1736	2.3		2945	3.9	
40	698.2	1312	1.9	459	0.6		1813	2.6		3590	5.1	
41	1050.4	228	0.2	72	0.1		1408	1.3		1710	1.6	
42	1662.3	5	0	3	0.0		804	0.5		812	0.5	
43	1336.6	1005	0.8	326	0.2		2297	1.7		3631	2.7	
44	297.3	730	2.5	315	1.1		771	2.6		1819	6.1	

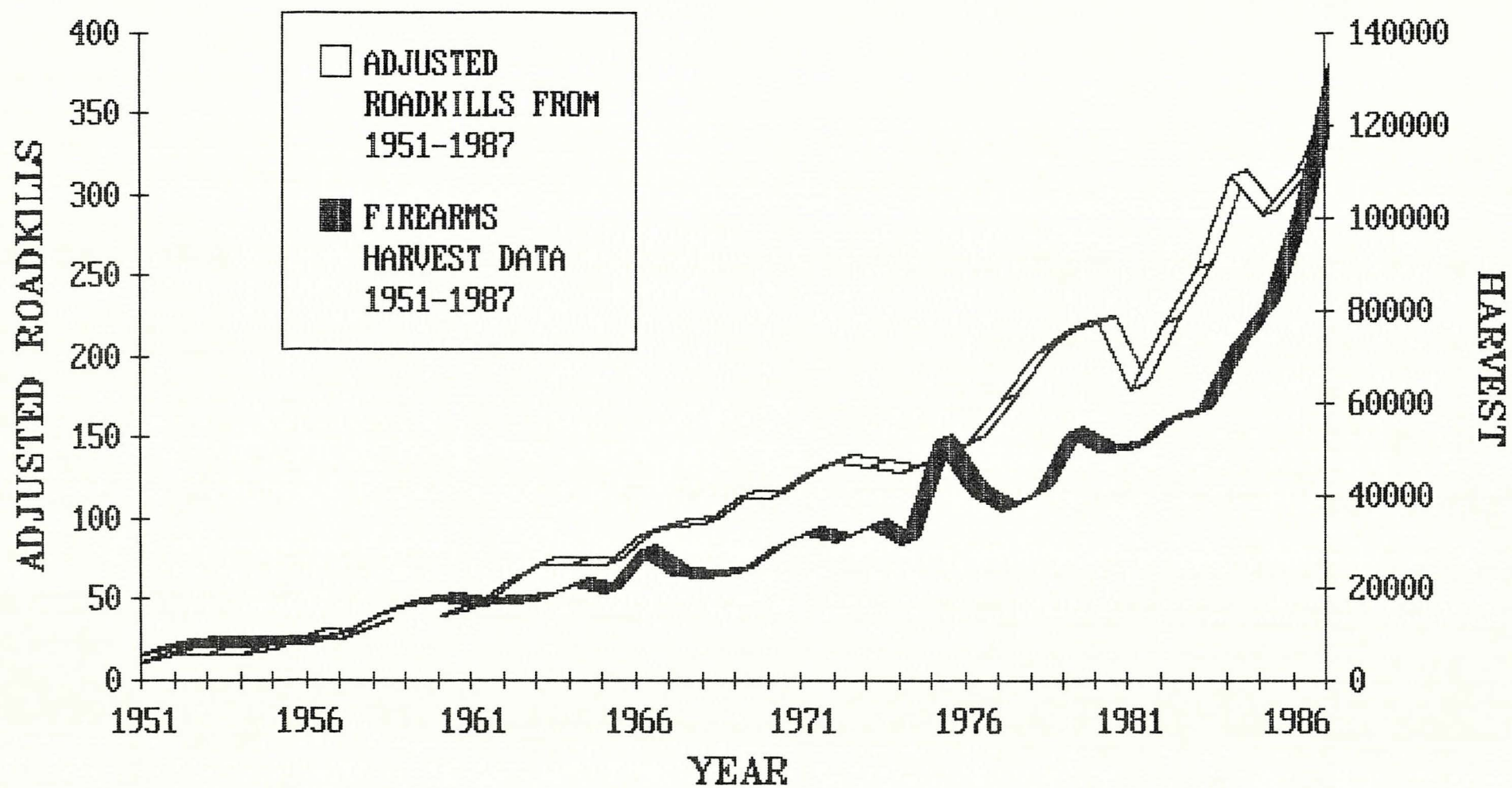


Table 13 (continued):

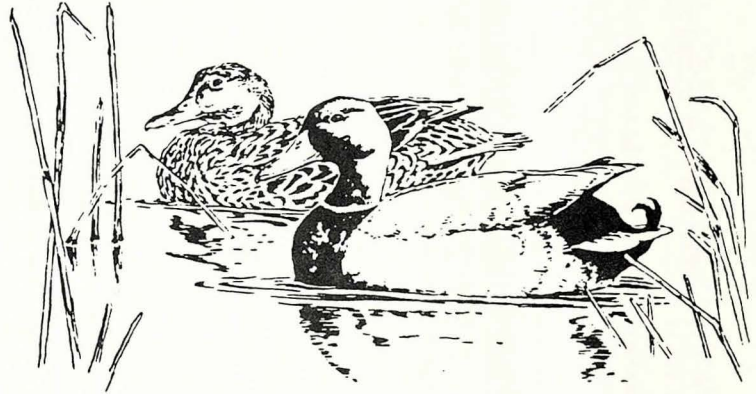
Mgmt. Unit	Forest mi <sup>2</sup>	Doe		Buck Fawn Harvest	Buck Fawn		Antlered Buck Harvest	Antlered Buck		Total*	Total Harvest*	
		Harvest	Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>		Harvest	Per Forest mi <sup>2</sup>
45	146.9	175	1.2	55	0.4		255	1.5		486	3.3	
46	360.7	865	2.4	288	0.8		941	2.6		2097	5.8	
47	135.1	40	0.3	15	0.1		151	1.1		206	1.5	
48	531.5	873	1.6	282	0.5		1048	2.0		2203	4.1	
49	776.4	917	1.2	315	0.4		1441	1.9		2674	3.4	
50	398.6	659	1.7	239	0.6		1005	2.5		1904	4.8	
51	555.8	1150	2.1	462	0.8		1793	3.2		3406	6.1	
52	649.5	1151	1.8	443	0.7		1967	3.0		3563	5.5	
53	817.5	52	0.1	17	0.0		859	1.0		928	1.1	
54	184.7	0	—	2	0.0		120	0.6		123	0.7	
55	844.9	245	0.3	89	0.1		1158	1.4		1492	1.8	
56	66.8	27	0.4	12	0.2		135	2.0		174	2.6	
57	97.1	0	—	0	—		136	1.4		136	1.4	
Unknown	—	37	—	9	—		76	—		125	—	
<b>TOTAL</b>												
	21,465.9	45,671	2.1	16,985	0.8		69,684	3.2		132,500	6.2	

\* Includes deer of unknown sex and/or age.

FIGURE 19. TREND INDICATORS FOR **WHITE-TAILED DEER** POPULATIONS IN MISSOURI, 1951-1987.







### MIGRATORY WATERFOWL

Federal, state and provincial wildlife agencies share in the management of North American waterfowl resources. Extensive population and harvest surveys are required annually to monitor population status. The condition of habitats used by breeding ducks as well as winter or breeding population levels of ducks and geese are used to portray continental or flyway trends. These provide broad framework for managing waterfowl resources.

Populations of waterfowl on a statewide or more localized level reflect variable habitat and weather conditions. Hunting success in Missouri is usually related to these local conditions, rather than the status of habitats and populations in the flyway. The data presented provide information concerning continental and/or flyway conditions as well as populations and harvests in Missouri (Tables 14-20, Figure 20).

Hunting opportunity will be reduced for ducks in 1988-89 due to shorter seasons and shooting hours; 30 vs. 40 days and sunrise vs. half-hour before sunrise opener in 1987. A series of drought years coupled with agricultural encroachment on nesting and brood habitat have resulted in very low expectations for production in 1988. The fall flight index is similar to 1987, but to protect the breeding population additional restrictions have been imposed.

Hunting opportunity for Canada geese should increase in 1988. Within the Swan Lake Zone (SLZ) the season length will remain the same, but the arrangement of days will differ from past years. A split season will be in effect with the second opener delayed until the SLZ population is typically higher. This should help protect the early cohort of geese and provide additional hunting opportunity. Recent information derived from neck collar work showed the southeast corner of the state to be more closely tied to the Mississippi Valley Population rather than the Eastern Prairie Population of Canada geese. This allowed the bag limit in the southeast zone to be raised from 1 daily in 1987 to 2 daily in 1988.



TABLE 14. Indices [x 1000] to **waterfowl** habitat, populations and harvest, 1977-1988.

Index	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
May Ponds	3,049	5,212	6,381	2,902	2,126	4,642	5,165	4,224	5,610	5,760	3,946	2,904
July Ponds	1,860	2,217	2,558	1,235	1,331	2,544	3,179	2,525	2,300	2,662	2,058	1,528
Breeding Ducks	38,044	41,083	45,222	42,198	38,557	36,655	38,598	38,054	30,883	35,034	35,080	33,646
Breeding Mallards	8,166	7,615	8,354	8,003	6,760	6,684	7,107	5,974	5,475	6,303	6,691	6,549
FFI-Total Ducks	84,778	89,833	95,159	80,375	77,569	75,892	82,727	79,752	62,018	72,685	74,512	65,653 <sup>a</sup>
FFI - Mallards	12,807	13,978	16,066	12,459	10,524	11,568	14,058	10,300	8,500	10,900	11,600	10,200 <sup>b</sup>
Total Duck Harvest												
Flyway	5,794	6,115	6,197	5,712	5,286	4,715	5,581	5,526	3,966	3,982	3,644 <sup>c</sup>	—
Missouri	258	240	254	203	232	210	244	245	191	176	162	—
Mallard Harvest												
Flyway	2,270	2,257	2,346	2,347	2,062	1,782	2,018	1,796	1,533	1,550	1,478	—
Missouri	144	121	147	124	120	113	152	114	92	97	93	—
Mid-Winter Survey												—
Total Ducks-Flyway	4,720	6,436	5,274	5,907	6,196	4,611	3,938	5,426	5,063	4,174	6,130	—
Missouri	516	157	315	213	219	405	62	164	210	153	165	—
Mallards-Flyway	2,605	3,073	2,360	2,622	2,493	1,878	1,440	1,969	2,168	1,924	2,777	—
Missouri	485	122	292	197	203	389	50	152	183	136	136	—

Pond indices, breeding ducks and fall flights estimates from data collected on spring and summer surveys of habitat and breeding ducks in the northern U.S. and Prairie Canada.

a. FFI - fall flight index - preliminary for 1988.

b. Projected flight based on a production index of 1.8.

c. Preliminary harvest estimates for 1987.

TABLE 15. Average **duck** populations on Missouri wetland areas, 1970-86\*

Month/week	Duck Creek	Ted Shanks	Fountain Grove	Swan Lake	Squaw Creek	Schell-Osage	Montrose
October/1	2,000	1,300	9,200	25,700	14,900	7,600	400
October/2	3,600	2,900	11,800	19,600	18,000	8,600	3,000
October/3	5,500	10,400	12,900	24,600	23,800	16,600	3,300
October/4	10,800	20,800	16,800	36,100	41,700	18,200	9,200
November/1	11,500	29,400	13,400	52,000	123,400	27,100	14,900
November/2	10,700	47,000	15,500	56,800	114,200	32,200	16,300
November/3	12,800	47,900	18,300	60,400	125,500	39,400	28,800
November/4	13,300	70,000	14,700	29,600	153,100	36,400	27,100
December/1	11,600	46,800	8,100	22,600	158,500	37,300	19,000
December/2	8,800	14,300	7,200	27,000	70,300	31,900	34,600
December/3	7,900	--	5,100	6,600	69,800	22,100	39,200
December/4	5,500	--	2,600		21,500	16,700	29,500
January/1	3,900	--	2,600	3,679	20,300	26,300	30,400
January/2	3,000	--	--	--	5,800	14,500	3,300
January/3	3,100	--	--	--	--	--	--
January/4	4,100	--	--	--	--	--	--

\* From aerial and ground count surveys.

TABLE 16. Missouri duck seasons, 1950-1988.

Year	Statewide Seasons	North Zone Seasons	South Zone Seasons	Season Length	Hunters	Regular Season Harvest
1950	11/3-12/7			35	53,000	0
1951	10/26-12/9			45	65,000	0
1952	10/20-12/13			55	57,094	0
1953	10/23-12/16			55	46,338	0
1954	10/22-12/15			55	49,447	0
1955	10/28-1/5			70	75,558	0
1956	10/26-1/3			70	72,437	0
1957	10/25-1/2			70	77,200	0
1958	10/24-1/1			70	73,152	0
1959	11/6-12/25			50	49,214	0
1960	11/1-12/20			50	40,857	0
1961	11/3-12/2			30	32,400	124,599
1962	11/2-11/26			25	22,300	26,136
1963	10/25-11/28			35	27,100	60,427
1964	10/30-12/8			40	32,400	105,689
1965	10/29-12/7			40	30,900	110,652
1966	11/1-12/15			45	34,800	149,445
1967	11/1-12/10			40	46,100	228,350
1968	11/1-11/30			30	35,300	105,962
1969	11/1-11/30			30	43,500	200,422
1970	10/24-12/17			55	50,000	281,573
1971	10/31-12/19			50	49,400	246,324
1972	10/29-12/17			50	49,800	197,761
1973	11/1-12/15			45	45,700	161,226
1974	10/30-12/18			50	49,800	236,976
	[open noon]					
1975	10/29-12/17			50	52,400	311,620
	[open noon]					
1976	10/26-12/5			45	51,600	20,331
	12/26-1/3					
1977		10/25-12/8	11/15-12/29	45	53,100	257,945
1978		10/24-12/12	11/14-1/2	50	51,600	239,751
1979		10/24-12/12	11/14-1/2	50	45,100	253,976
1980	11/1-12/15	10/18-10/22	12/26-12/30	50	39,300	202,477
1981	10/31-12/4	10/17-10/21	12/26-12/30	50	41,200	231,953
1982	10/30-12/13	10/16-10/20	1/8-1/12	50	39,500	209,900
1983		10/15-10/19	11/1-12/4	50	37,700	243,500
		11/1-12/15	12/17-1/1			
1984		10/20-10/24	11/1-12/2	50	37,900	245,174
		11/1-12/15	12/15-1/1			
1985		10/19-10/21	11/2-12/1	40	32,500	177,042
		11/2-12/8	12/27-1/5			
1986		11/1-12/10	11/22-12/14	40	34,000	175,911
			12/27-1/12			
1987		10/31-12/9	11/21-12/13	40	31,600	161,181
			12/26-1/11			
1988		11/5-12/4	11/19-12/4	30	--	--
			12/26-1/8			



TABLE 17. Average statewide **duck** harvest/five-day periods, 1970-86.\*

Month/5-day period	Mallards	Wood Ducks	Ten point	Total
			ducks	
October/4 and 5	1,393	2,531	3,567	7,792
October/6	2,669	1,731	3,643	8,602
November/1	3,484	1,058	2,836	7,981
November/2	3,456	471	1,734	6,127
November/3	3,031	316	1,070	4,731
November/4	2,554	146	897	3,867
November/5	3,063	140	840	4,421
November/6	2,505	53	576	3,334
December/1	2,188	57	456	2,860
December/2	1,668	36	337	2,210
December/3	1,517	1	147	1,785
December/4	1,076	0	103	1,269
December/5	197	0	53	347
December/6	486	0	28	654
January/1,2 or 3	196	0	10	209

\*U.S. Fish and Wildlife Service estimates.

TABLE 18. **Waterfowl** hunter success and hunter pressure on MDC areas, 1970-86<sup>1</sup>.

Area	TOTAL DUCKS/HUNTERS							HUNTERS/DAYS						
	Oct.	1-15	16-30	1-15	16-31	Jan.	Ave.	Oct.	1-15	16-30	1-15	16-31	Jan.	Ave.
Otter Slough <sup>3</sup>		.87	.64	.54	.85	.75	.74	*	14.99	12.64	8.46	8.32	10.10	12.35
Duck Creek	1.53	1.30	1.02	.73	.49	.34	1.00	111.66	128.85	98.43	82.08	68.91	73.10	100.57
Ted Shanks <sup>2</sup>	1.22	1.20	.92	.72	.58	.00	.99	95.63	105.79	84.08	61.11	52.19	0.00	86.24
Fountain Grove	1.16	.74	.70	.57	.78	.00	.72	132.72	156.11	86.43	47.25	26.63	0.00	102.38
Schell-Osage	2.00	1.45	1.19	.98	.94	.00	1.29	86.71	73.26	63.82	45.58	39.18	0.00	63.77
Montrose	.78	.95	1.03	1.05	1.66	.00	1.00	28.49	28.66	25.49	23.10	13.81	0.00	25.93

<sup>1</sup> Based upon data from biological check stations.

<sup>2</sup> 1976-86

<sup>3</sup> 1983-86

TABLE 19. **Canada goose** population levels in the Swan Lake Zone, 1954-87.

Year	Mid October	Early November	Early December	Mid December	Early January	Peak Population
1954	27,100	63,500	103,000	43,000	30,250	104,000
1955	96,000	57,000	21,050	15,100	16,000	133,000
1956	54,945	47,950	36,975	31,745	12,500	55,400
1957	21,500	42,025	17,500	28,250	9,070	42,025
1958	45,600	44,300	10,400	25,900	18,700	59,350
1959	45,600	57,950	32,800	28,240	27,590	57,950
1960	88,405	60,500	45,200	50,000	43,575	88,405
1961	73,600	71,600	54,900	38,300	39,000	73,600
1962	74,450	107,950	95,200	102,500	77,200	118,200
1963	111,800	122,000	124,150	84,650	80,150	130,225
1964	99,110	119,000	45,730	50,855	62,290	121,450
1965	90,935	89,980	83,250	110,750	83,360	119,350
1966	102,775	137,050	104,350	123,235	105,850	139,525
1967	105,800	118,965	106,605	92,020	95,210	127,265
1968	88,775	137,500	14,500	120,730	116,715	137,500
1969	87,050	105,100	96,370	91,950	98,070	110,200
1970	77,200	104,425	114,800	95,300	97,400	114,800
1971	83,075	124,195	140,400	119,625	156,700	156,700
1972	114,935	138,865	145,820	150,570	125,920	152,550
1973	91,350	147,200	160,800	174,900	125,920	174,900
1974	105,300	160,350	161,225	163,650	150,000	163,650
1975	99,625	171,225	189,475	171,100	176,650	189,475
1976	92,300	169,250	192,925	210,350	113,475	210,350
1977	108,440	114,000	189,300	209,200	232,210	232,210
1978	100,700	124,250	132,250	143,725	60,325	143,725
1979	101,850	96,175	127,500	116,550	57,025	127,500
1980	43,600	81,750	129,875	82,025	45,500	129,875
1981	82,950	109,800	96,200	83,050	23,975	122,900
1982	91,625	137,300	107,250	163,950	79,775	163,950
1983	83,675	134,200	78,100	107,750	8,500	134,200
1984	66,350	76,375	65,640	75,500	17,880	76,375
1985	79,625	90,725	41,750	33,125	38,400	90,725
1986	79,325	45,825	25,300	40,600	29,000	79,325
1987	31,950	50,125	38,400	41,250	66,750	66,750

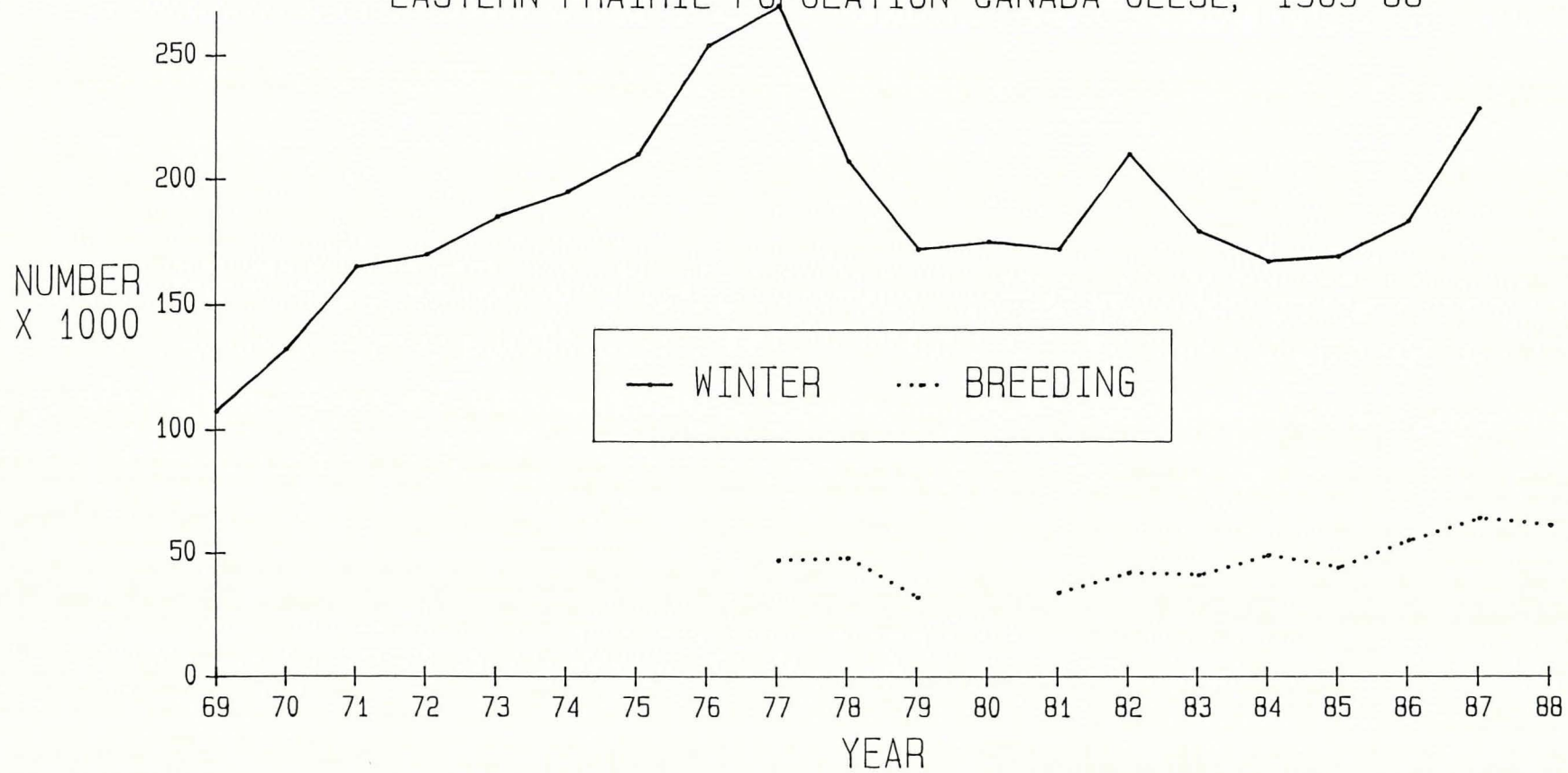


TABLE 20. Missouri **goose** harvest, 1948-1987.\*

Year	Statewide Harvest	Canada Geese	Snow Geese	Blue Geese
1948	0	0	0	0
1949	0	0	0	0
1950	0	0	0	0
1951	0	0	0	0
1952	0	0	0	0
1953	0	0	0	0
1954	0	0	0	0
1955	0	0	0	0
1956	0	0	0	0
1957	0	0	0	0
1958	0	0	0	0
1959	34,811	0	0	0
1960	56,016	0	0	0
1961	29,200	0	0	0
1962	24,295	22,695	536	886
1963	43,110	34,315	4,548	3,445
1964	41,074	33,625	5,209	2,126
1965	40,102	32,510	4,002	3,590
1966	63,515	40,305	11,586	11,239
1967	79,911	71,877	4,651	3,383
1968	61,024	47,181	8,044	5,406
1969	59,290	39,753	9,608	9,675
1970	58,442	33,505	15,490	9,302
1971	65,349	37,927	17,321	10,101
1972	55,156	41,000	8,400	4,600
1973	60,909	40,282	11,561	8,900
1974	89,893	64,360	15,494	10,040
1975	116,736	81,825	17,773	15,139
1976	71,024	59,907	6,306	4,476
1977	84,553	65,032	10,737	8,785
1978	79,544	68,275	5,779	5,491
1979	73,113	57,400	8,780	6,654
1980	50,881	44,742	2,512	3,240
1981	55,358	45,027	4,963	5,166
1982	52,266	42,083	4,011	5,659
1983	61,674	36,677	13,973	10,177
1984	56,325	41,489	7,496	7,204
1985	52,610	36,948	8,017	6,866
1986	56,352	20,091	13,595	11,296
1987	35,510	27,362	4,385	3,442

\*Estimates from U.S. Fish and Wildlife Service harvest surveys.

FIGURE 20. INDEXES TO WINTER POPULATION AND BREEDING PAIRS OF  
EASTERN PRAIRIE POPULATION CANADA GEESE, 1969-88





### GIANT CANADA GEESE

The population status of giant Canada geese is determined through periodic censusing on public and private land, banding, and annual nesting surveys on public lands. During the 1987 breeding season (April 15 - May 30), Canada geese were observed in 65 counties, ten more than the previous (1982) survey (Figure 21). This compares with observations in 29 and 36 counties during 1967 and 1977, respectively.

Annual banding operations reflect the minimum population of geese on a particular area during the flightless period. During 1975-1988 the number of geese captured at 10-12 locations increased from 2,174 to 4,329. Only 2 years show apparent decreases in Canada goose numbers. Roundup results during 1988 are shown in Table 21.

A 1987 survey of wildlife area managers indicated that giant Canada geese were present on at least 16 wildlife or fisheries areas where banding was not conducted. Breeding populations were established (5 or more nests) on 6 areas and 1-3 nests or non-breeding birds were observed on 10 areas.

As new developments are completed (wetlands, fishing lakes, etc.), opportunities for viewing and hunting Canada geese on public lands will increase.

Although production varies annually, the long-term trend for giant Canada geese appears to be for increasing numbers and distribution. Future population growth will likely continue but will eventually be dependent upon a combination of suitable habitat, human tolerance and harvest.



FIGURE 21.

COUNTIES IN MISSOURI WITH AT LEAST 5 NESTING PAIRS OR 25 TOTAL CANADA GEESE ON PRIVATE LAND - 1987 SURVEY.

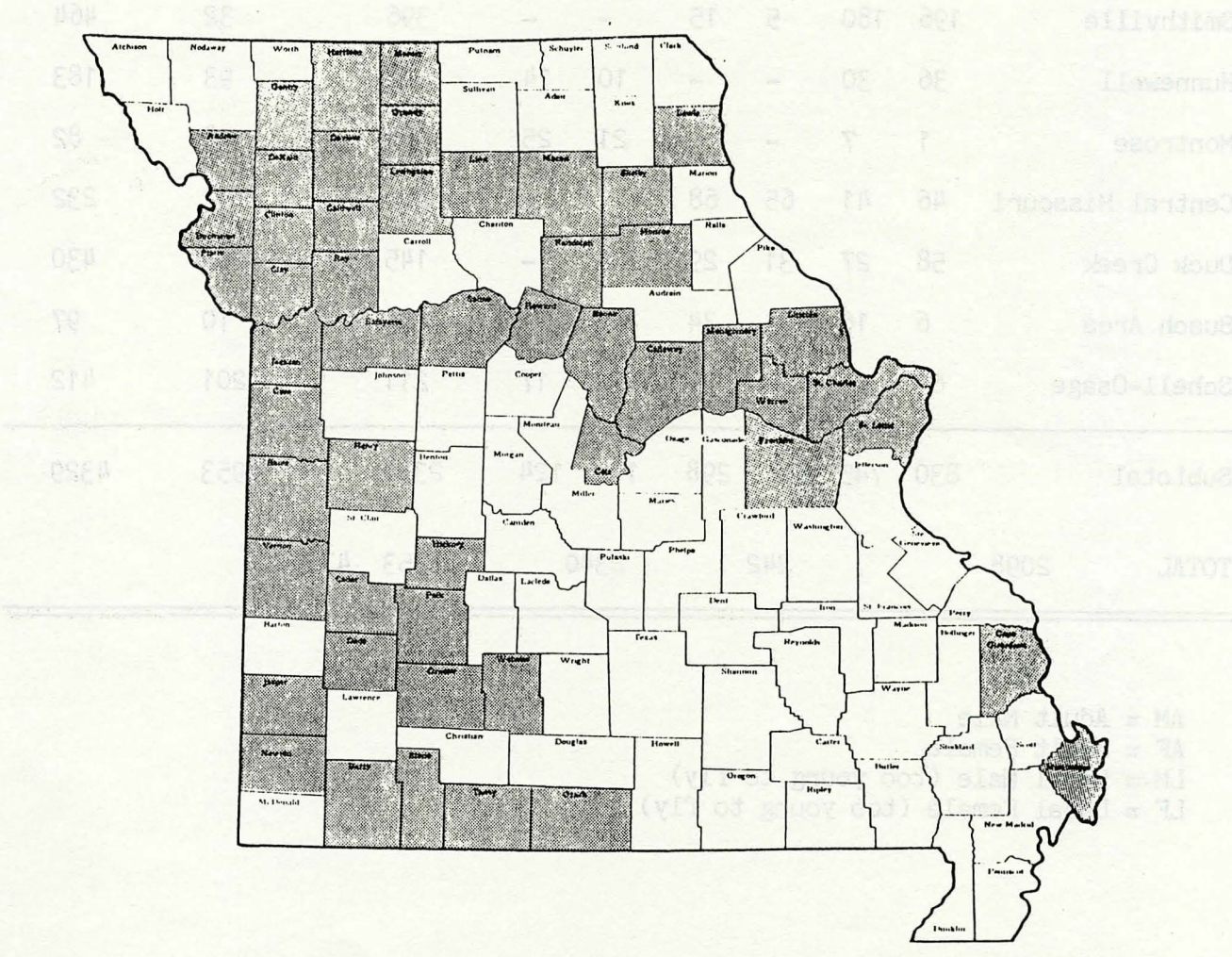


TABLE 21. 1988 Giant Canada goose roundup results.

Area	BANDED & RELEASED				TRANSFERS		Total Banded	Recaptures	Total Captured
	AM	AF	LM	LF	LM	LF			
White River Lake	74	74	72	83	30	30	363	528	891
James A. Reed	22	17	4	2	12	13	70	53	123
Pony Express	328	289	3	33	26	25	704	711	1415
Smithville	196	180	5	15	-	-	396	32	464
Hunnewell	36	30	-	-	10	14	90	93	183
Montrose	1	7	-	-	21	25	54	28	82
Central Missouri	46	41	65	68	-	-	220	12	232
Duck Creek	58	27	31	29	-	-	145	285	430
Busch Area	6	16	31	34	-	-	87	10	97
Schell-Osage	63	64	14	34	19	17	211	201	412
Subtotal	830	745	225	298	118	124	2340	1953	4329
TOTAL	2098		242		2340		1953	4329	

AM = Adult Male

AF = Adult Female

LM = Local Male (too young to fly)

LF = Local Female (too young to fly)